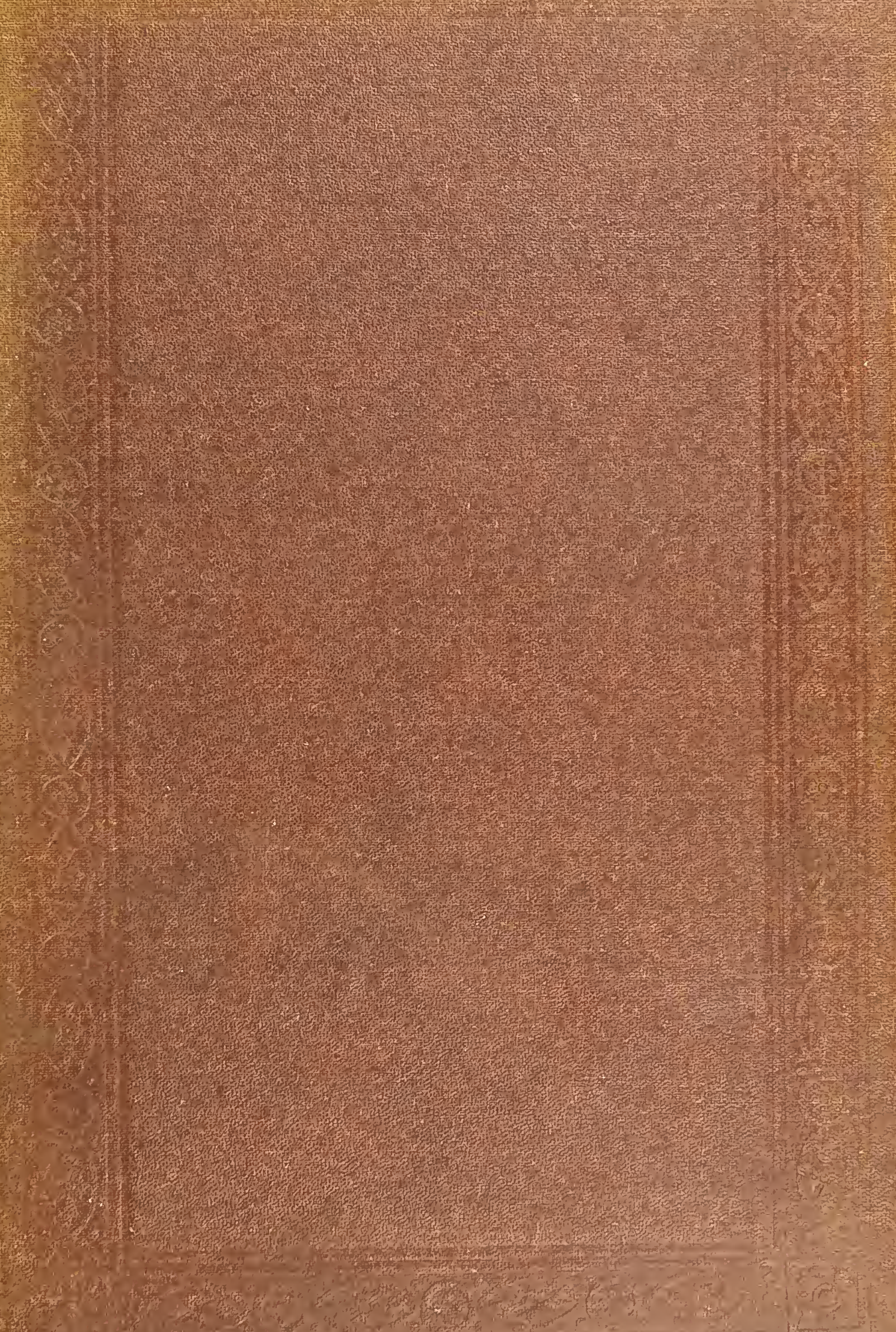

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BRISTOL
ROYAL
INFIRMARY.

TEXT-BOOK

OF

SKIN DISEASES.

BY

DR. ISIDOR NEUMANN,

LECTURER ON DERMATOLOGY IN THE IMPERIAL UNIVERSITY OF VIENNA.

TRANSLATED FROM THE SECOND GERMAN EDITION, BY
SPECIAL PERMISSION OF THE AUTHOR,

BY

ALFRED PULLAR, M.D., EDIN.,

PHYSICIAN TO THE EAST LONDON HOSPITAL FOR CHILDREN.

WITH SIXTY-SEVEN WOODCUTS.

LONDON:
ROBERT HARDWICKE, 192, PICCADILLY, W.

MDCCCLXXI.

AUTHOR'S PREFACE

TO THE FIRST GERMAN EDITION.

ALTHOUGH dermatology has been materially advanced by important researches emanating from England, France, Germany, and other countries, towards the close of the last and in the course of the present century, it will be universally admitted, that since the year 1840, we have been indebted to the Vienna school, and especially to Hebra, for the investigations by which this subject is placed amongst the exact sciences. Until comparatively recent times, the study of skin diseases was limited chiefly to the external phenomena, and theories regarding the nature of the morbid process were founded merely on the superficial aspect of the eruption. Whilst we are far from underrating the practical value of such a mode of study, we must direct attention to the more scientific and objective method of the present day, and especially to microscopic researches, which, by elucidating the histological changes produced by disease, afford the only basis for rational views concerning the nature and etiology of skin affections. The pathology of the skin has been greatly extended by the recent progress in morbid anatomy and histology. Chemistry has afforded less satisfactory results, on account of the difficulty attending the investigation of minute and complex tissues and their secretions; chemical science, however, is probably destined to solve many a problem.

Notwithstanding numerous works, there was still wanting a German text-book, comprising a brief and complete account of modern researches. When we consider, however, that cutaneous pathology is only in its development, the task of condensing its results within a few pages will in itself appear difficult, for views at present accepted as correct, may, within a short time, be refuted by new observations; and the undertaking is rendered more difficult by the expectations which are naturally formed of a modern text-book of dermatology. In attempting such a work, therefore, I have to crave the indulgence of my Colleagues.

In this work,—without omitting practical details,—I have treated specially of the anatomical changes in skin disease, which have been verified by other observers or by myself. In those chapters where my own researches seemed insufficient, I have laid under contribution the works of other authors,—especially Frey's Histology, on the anatomy of the normal skin; F. Mayer's treatise in Virchow's "Handbuch der speciellen Pathologie und Therapie," 3. Band, on measles; and "Niemeyer's Pathologie und Therapie," 2. Band, on scarlatina.

In this treatise, I have naturally adopted many of Hebra's views, for, as his pupil during many years, and later as an independent observer, I have had ample opportunity of testing and verifying the doctrines which he inculcated.

The Illustrations have been executed by Dr. C. Heitzmann, and will render the microscopic results more intelligible to my readers.

In conclusion, I have only to express my best thanks to Professors Hebra, Hebra, Rokitansky and Wedl, for their kind assistance and co-operation during the progress of the work.

Vienna, December, 1868.

PREFACE TO THE SECOND EDITION.

The rapid sale of the first edition, is sufficient proof that this work supplied an acknowledged want in literature. I am, therefore, encouraged to follow out the original plan, adding, at the same time, new discoveries, so as to render some of the chapters more complete,—especially those which treat of the senile changes of the skin, and of parasitic affections,—additions which will, doubtless, be acceptable to students. I have also increased the number of woodcuts, which, as before, have been beautifully executed by Dr. C. Heitzmann. I would fain hope that the same measure of success may attend the present as the first edition of my work.

ISIDOR NEUMANN.

Vienna, July, 1870.

TRANSLATOR'S PREFACE.

The absence of an English treatise on dermatology embracing the important discoveries effected by the microscope, has induced me to translate Dr. Neumann's recent work, which presents a summary of researches hitherto imperfectly known in this country.

In the translation, my aim has been to render the exact meaning of the original, without sacrificing the phraseology of our own language to German idiomatic expressions. Throughout the work I have occasionally been obliged to omit repetitions, and to correct slight inaccuracies, but I have carefully avoided excluding any important fact, or opinion of the Author. Whilst retaining the general plan of the original text, I have transposed certain passages in order to adapt the work to the requirements of English readers.

My best thanks are due to Dr. Neumann, for his kindness in placing at my disposal for translation the sheets of the second edition, and also the casts of the original woodcuts which illustrate the present volume.

A. P.

London,

September, 1871.

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INTRODUCTION.

If we commence with a simple enumeration of scattered references concerning the literature of cutaneous diseases, as far as the defective nomenclature permits, which, not only in ancient times, but in our own days, has rendered so difficult the terminology of this branch of medical science, we find, even in remote antiquity—especially among the Greeks, Egyptians, and Jews—descriptions of numerous skin diseases, which, however, we cannot with certainty identify with those prevalent in modern times. For instance, in *Leviticus* numerous morbid processes are described with great minuteness, of which, however, we can only recognise with certainty burns, tumours, affections of the head and beard, and ulcers; whilst the designations of the diseases *zaraath* and *schechin* leave it doubtful whether the former refers to lepra (*Elephantiasis Græcorum*), and the latter to favus, variola, or quite other diseases.

The work of *Polybius* (De Natura Pueri) contains a few particulars in regard to the anatomy of the skin, especially as to the conditions of the hair, the epidermis, and cutaneous glands.

Hippocrates (460 B.C.) is to be regarded as the founder of Greek dermatology, and the terms which he employed are still in vogue: *exanthemata* as the general designation of skin diseases (*εξανθειν*, efflorescere), *anthraces*, *phymata* (pustules, variola?), *erysipelas*, *psora* (for diseases accompanied with itching, as eczema, scabies, prurigo), *lepra* (scaly eruptions), *herpetes*, etc.; several of these terms, however, are now applied to other forms of disease. The loss of hair in consequence of old age he termed *madisis*, and by *alopecia* he designated the loss of hair from disease. According to him, all affections of the skin are caused either by a local or general disease; the latter being effected by morbid humours. *Lepra*, *psora*, and *lichen*, however, constitute the principal diseases known to him, and of these *lichen* represents a milder, and *lepra* a more severe form of disease. The term *herpes* is sometimes applied to the diseases which form regular eruptions on the skin, and sometimes to the affection which is now known as *lupus* (*H. esthiomenus*), and also to callosities. Hippocrates designated by the term *ecthyma* pustular eruptions on the integument, and it is probable that this referred to variola. The terms *phlyctæna*, *hydroa*, and *pomphoi*, are also employed by this author.

Cornelius Celsus (25 A.D.) had to add but few terms to those used by Hippocrates. He directs special attention to the external aspect of skin diseases, and gives a detailed account of the following affections:—*anthrax*, *carcinoma*, *therioma* (*herpes esthiomenus*), *papulæ* (*eczema*, *lichen*), *pustulæ*; 4 varieties: *a*, from perspiration, etc.; *b*, with variously coloured contents and ulcerated base; *c*, hard and pointed pustules, with purulent or sanious contents (*φλυζακιον*); *d*, pustules of light or dark colour with well-marked inflammatory areola, and formation of ulcers (ex frigore, ex igne, ex medicamentis); *scabies* (referring to the *psora* of Hippocrates), *sycosis*, *varus*, and *vitiligo*. The term *impetigo* he employs to designate eruptions which occur on the face.

Two varieties of *papulæ* are distinguished as follows:—"Altera est, in qua per minimas pustulas cutis exasperatur et rubet, leviterque roditur, altera autem est, quam *ἀγριαν*, *i.e.*, feram Græci appellant." He does not, therefore, make any distinction between *pustulæ* and *papulæ*. The terms *favus* and *porrigo* are applied as well to dry as to suppurating eruptions on the scalp; *sycosis* is an ulceration of the scalp and hairy part of the face; *area* designates baldness occurring in the form of circles or lines. *Varus* and *acne* are identical; besides which, Celsus elaborately describes *elephantiasis*, *leuce*, and *alphos* (*vitiligo*).

Plinius (32 A.D.) fully describes *mentagra*, which was then imported from Asia to Rome, was transmitted by kisses from mouth to mouth, and infected a great number of the populace. This disease began on the face, and extended to the neck, chest, and arms; it is, therefore, not identical with our mentagra: *herpes zoster* also is minutely described by Plinius, and somewhat later by Scribonius Largus (43 A.D.).

Galen (131-201 A.D.) simply recapitulates the diseases known to Hippocrates and Celsus, but applies the terms *pustulæ* also to exudations in the internal organs, *febris pemphigosa* to various pustules on the skin, and *pomphix* to another form of disease. He divides skin diseases into those of the scalp and those of other parts of the integument, describes a few cases of *herpes* and *elephantiasis,* and enumerates certain remedies which are useful in *erysipelas, achor lichen, varus,* and *sycosis* (de ficosis tumoribus).

Aëtius of Amida (543 A.D.) is the first who applies the term *eczema* (εκζεω) to vesicular and pustular eruptions, and to those affections which are accompanied with heat and pain, and which cover the entire integument; whilst, somewhat later, *Paulus Ægineta* uses this term for papules, and describes also psoriasis, although under a different name.

Coelius Aurelianus, Alexander Trallianus, and *Johannes Actuarius,* are later authors, and recapitulate only what was known before.

The ancient medicine of India imputes the origin of skin diseases especially to three sources :—air or ether, gall, and mucus. *Alopecia, head-scall* (*favus*), *nettle-rash, pimples, ulcers, small-pox, lepra,* and *abscesses* are here described.

In the medical literature of Arabia, the above-mentioned observations of Roman and Greek authors are noticed. As is well known, the preparation of medicines is the essential feature of the Arabian medical science. There are also, however, descriptions of *variola Razes,* 850), *rubeola, elephantiasis, alopecia, vitiligo,* and *impetigo. Avicenna* (980) mentions *pustula maligna, ichthyosis, favus* (*sahafati sicca*), accurately delineates *prurigo* under the term *impetigo,* and describes *pemphigus* and *rupia.* This author occupies the same position in the medicine of Arabia as Galen in that of Rome. *Avenzoar* (1162) describes the *itch-parasite.* The Arabian authors were highly esteemed, and their doctrines universally accepted till the fourteenth century.

Manardus (Epistolæ Medic., Lutetiæ, 1528) is the first author who employs the term *lupus,* but only to designate ulcers on the legs. *J. Gorræus* describes *acne* (Definitionum Medicarum, Francoforti, 1578) ; and *J. Fernelius Ambranus, syphilis* (De Externis Corporis Affectibus, Francoforti, 1592).

In the thirteenth and fourteenth centuries the majority of writers occupied themselves chiefly with the description of *leprosy:* (*Guy de Chaliac, Rogerius, Rolandus,* and *B. Gordonius,* in France; *Gilbertus,* in England ; *Theodorius,* in Spain ; *Salcreto,* in Italy ;) and when this disease became extinct in Europe, with the exception of the coast lines, *syphilis,* as is well known, made its appearance in the year 1492, when the French occupied Italy. This disease attracted the attention of medical authors partly on account of its rapid increase, and partly on account of its destructive effects on the skin and bones. The prominent authors of this period who especially treated of syphilis are the following:—*Manardus*, *Nicholaus Florentinus*, *Ambrosius Parè*, and *Astruc*. *Guy de Chaliac* also describes *tinea*, the description of which answers more to *impetigo*, *eczema*, *sycosis*, or *favus*; he also mentions the infectious nature of *itch*. *Vidus Vidius* (1569) describes *varicella*; *Fernelius* (1497), *lentigo*, *pustula*, and *syphilis*; *Forestus* (1522), *pemphigus* and *itch*; *Schenk*, the diseases of the hair, *sycosis* and *lichen*; *Sennertus*, the morbid colorations of the skin, liver-spots, offensive foot-sweats, scarlatina, and measles; *Döring* (1619) gives an accurate description of *scarlatina*. The works of these writers date from the fifteenth, sixteenth, and seventeenth centuries.

In the sixteenth, seventeenth, and eighteenth centuries, *scurvy* especially occupied the attention of medical writers: there are also indisputably descriptions of *scarlatina*, *petechial typhus*, *varicella*, and especially of *favus*.

In the year 1572, *Mercurialis* (De Morbis Cutaneis ex ore H. Mercurialis Venetiis, 1601) wrote an elaborate work, which recapitulated the observations of earlier physicians, and which was published in Venice by his pupil, *Paulus Aicardius*. Mercurialis draws a distinction between diseases of the scalp and those of the rest of the body—*impetigo*, *lichen*, *pruritus*, *scabies*, and *psora*; *favus* he especially describes in a comprehensive manner. In the year 1610, *Riolanus* classes skin diseases, as pustules, tubercles, and anomalies of the structure.

Hafenreffer (Nosodoctrium in quo cutis eique adhærentium partium affectus omnes trachentur, Tübingen, 1630) especially treats of small-pox, measles, venereal disease, and comedones.

Willis (Amsterdam, 1682) divides cutaneous diseases according to the presence or absence of tumefaction. Besides these, are smaller treatises by *Mark Aurel*, *Severinus*, *Felix Pater*, *Musitanus*, *de Haen*, *Ambrosius Parè* (1517-1536), and *Van Swieten* (1773).

Turner (London, 1714) introduces partly his own observations, partly those of others, and especially gives descriptions of *herpes*, *anthrax*, and *nævus*.

Lorry (Paris, 1777) is undoubtedly more advanced than any of the preceding authors, since his study both of the normal and abnormal integument convinced him that cutaneous diseases are either independent (idiopathic) or symptomatic: he also called attention to the secretory functions of the skin, and to the dangers which accompany the forced cure of eruptions; he also mentions the injurious effects of certain temperatures, and the influence which food, drink, labour, and rest, exercise on the skin.

Plenck (Vienna, 1776) divides skin diseases into 14 classes, according to the nature of the pathological products.

Robert Willan's work, 1798 (Description and Treatment of Cutaneous Diseases), is indisputably the most important of the eighteenth century, as well in regard to nomenclature and treatment, as to the knowledge of former treatises it comprehends, since he delineates with rare skill the particular diseases, and simplifies the nomenclature. Willan adopted Plenck's system, with the modification that the latter introduced 14 classes and 120 species, whilst the former commenced with 7 classes and 35 species, but concluded with 9 classes and 49 species. Willan was prevented from finishing his work, which was published, however, in a slightly modified form by his pupil *Bateman* (Practical Synopsis of Cutaneous Diseases according to the arrangement of Dr. Willan. London, 1815).

In France, other works soon followed those of Lorry, as, for instance, *Retz* (Des maladies de la peau et de celles de l'esprit, 1790), *de Roussel* (Diss. de variis herpetum speciebus), *Sauvage* (Nosologia methodica, Amstelodami, 1768), *Poupart* (Traités de dartre, Nosologia methodica sistens morborum classes juxta Sydenhami mentem et Botanicorum ordines auctore Boissier de Sauvages, Amstelodami, 1768); the most important, however, are the works of *Alibert, Biett, Cazenave,* and *Schedel.*

Alibert enunciated a natural system, which found only few followers, as very dissimilar forms of diseases were thus grouped together. His first work was published in the year 1810, under the title, Précis théorique et pratique sur les maladies de la peau. Paris.

Cazenave and *Schedel* published Biett's lectures (of which their master had only published a few), under the title, Abrégé pratique des maladies de la peau, IV. edition, Paris, 1847. They adopt Willan's system, and discuss with special care Biett's therapeutic observations.

Amongst the later French dermatologists may be mentioned:—

M. Gilbert (Traité pratique des maladies spéciales de la peau, II. edition, 1840), *Rayer* (Traité des maladies de la peau, Paris, 1835), *Chausit* (Traité élémentaire des maladies de la peau, Paris, 1853), *Devergie* (Traité pratique des maladies de la peau, Paris, 1854), *A. Cazenave* (Leçons sur les maladies de la peau, Pathologie générale des maladies de la peau, Paris, 1856), *Hardy* (Leçons sur les maladies de la peau, 1858), *Duchesne Duparc* (Compendium des maladies de la peau et de Syphilis. Traité pratique des Dermatoses, Paris, 1859); *Rochard* (Traité des maladies de la peau, Paris, 1860).

Dr. E. Baudot (Traité des affections de la peau d'après des doctrines de M. Bazin, 1869).

Dr. Ch. Caillants (Traité pratique des maladies de la peau chez les enfants).

E. Bazin (Leçons théorétiques et cliniques sur les affections cutanées, etc.).

Amongst English authors we enumerate :—

M. S Plumbe (Practical treatise on diseases of the skin, London, 1837) divides cutaneous diseases into local (acne, sycosis, porrigo) and constitutional, which are caused by a loss of tone of the vessels (purpura, ecthyma, etc.).

Green (Practical treatise on diseases of the skin, London, 1835); *Thomas Hunt* (Practical observations on the pathology and treatment of certain diseases of the skin, London, 1847); *Neligan* (Practical treatise on the diseases of the skin, Dublin, 1852); *Anthony Todd Thomson*, completed and edited by *Edmund A. Parkes* (A practical treatise on diseases affecting the skin, London, 1850).

Erasmus Wilson (A practical treatise on eczema, London, 1863, and on diseases of the skin, London, 1867).

Fox (Skin diseases, London, 1864).

Hillier (Handbook of skin diseases, London, 1864).

Howard Damon (The structural lesions of the skin, Philadelphia, 1868).

Mc C. Anderson (On the parasitic affections of the skin, eczema, psoriasis, London, 1868).

Wilson, Rayer, Chausit, Devergie, and *Anderson* have framed their systems rather on the nature of the diseases and the structure of the organs affected than on the mere external aspect.

Amongst German authors we enumerate :—

Plenck (Doctrina de morbis cutaneis, Viennæ, 1776). *Dr. Turner* (Abhandlung von den Krankheiten der Haut, 1766). *V. A. Riecke* (Handbuch der Krankheiten der Haut, Dresden, 1841). *Josef Frank* (Die Hautkrankheiten übersetzt von Dr. Ch. G. Voigt, Leipzig, 1843). *Struwe* (Uebersicht der Hautkrankheiten, Berlin, 1829).

Behrend (Monographische Darstellung der nicht syphilitischen Hautkrankheiten, Leipzig, 1869). *Froriep* (Abbildungen der

Hautkrankheiten). *Veel* (Grundzüge der Behandlung der Hautkrankheiten an der Heilanstalt zu Constadt, 1840, 1852, 1853, 1854, 1862). *Peter Frank* (1792, De curandis hominum morbis), who divided skin diseases into acute and chronic, idiopathic and symptomatic. *Schönlein*, who adopted the same classification, and discovered the fungus in favus. *C. H. Fuchs* (Die Krankhaften Veränderungen der Haut und ihrer Anhänge, Göttingen, 1840) attempted an entirely new nomenclature. *Gustav Simon* (Die Hautkrankheiten durch anatomische Untersuchungen erläutert, Berlin, 1851), who regarded more particularly the pathological changes in cutaneous diseases.

Rosenbaum and *Struwe*, who only added a systematically arranged nomenclature. *Baerensprung*, who, besides other treatises, published the following works:—(Anatomie der Hautkrankheiten. Die Hautkrankheiten. 1. Lieferung, 1859. Herpes zoster). Pemphigus. *A. Kleinhans* (Compendium der Hautkrankheiten, Erlangen, 1866. Die parasitaren Haut affectionen, Erlangen, 1864).

Amongst Norwegians are especially to be noted *Boeck* and *Danielssen* (Traité de la Spedalskhed). In recent times the progress of dermatology is shown by the number of special journals which have appeared in Germany, England, France, Italy, and America.

Hebra has advocated the mode of study which was inaugurated by him in Vienna, and since the year 1840 up to the present time has contributed largely to the various journals of Germany and other countries, and by oral lectures, delivered to students from all quarters, has justly captivated eloquent followers. This author has also published the first volume of a still unfinished work (Handbuch der speciellen Pathologie und Therapie der Hautkrankheiten), in which he enunciates his views and observations. The simplified nomenclature of Hebra, his keen logic, faculties of observation, and definite indications for therapeutic measures, which latter were partly known in former times, partly introduced by himself, will command the admiration of even those who are but slightly acquainted with his works. The progress in pathological anatomy through the labours of *Rokitansky*, *Virchow*, *Henle*, *Wedl*, and *Weber*, has also materially influenced dermatology.

We have now enumerated the more important of the great works, which have extended the study of dermatology from ancient to modern times; and this subject has now assumed a more scientific aspect from the use of good microscopes; instead of mere speculations regarding "morbid humours," and hypotheses derived merely from the external aspects of cutaneous diseases, this instrument has afforded us clear views concerning the real nature of many of these affections. The itch-parasite, although mentioned by Avenzoar, and in the year 1683 by Bonomo in a letter to Redi on the statements of Cestoni, as the cause of this disease, nevertheless had passed into oblivion, and the labours of *Hebra*, *Eichstedt*, *Gudden*, *Bourguignon*, *Gerlach*, and *Fürstenberg*, have only completely refuted the theory of itch-metastasis (Krätz-metastasen), which was accepted even by *Hahnemann* and *Autenrieth*. Gustav Simon discovered the *acarus folliculorum* in the excretory ducts of the sebaceous glands; Schönlein the *achorion* in *favus;* Malmsten the *tricophyton tonsurans* in *herp. tonsurans;* Grubi the *microsporon Audouini* in *alopecia areata;* Bazin the *microsporon mentagraphytes* in *sycosis;* Eichstedt the *microsporon furfurans* in *pityriasis versicolor;* Meissner the *nail-fungus* in *onychomycosis;* Köbner the fungus in *eczema marginatum.* The anatomical investigation of the cutis also led to important results, of which may be mentioned *Malpighi's* discovery of the sebaceous glands, and that of the sweat glands by *Breschet* and *Roussel de Vauzème;* the observations of *Henle* and *Wendt* regarding the structure of the epidermis, and of *Berres* and *Vohmann* on the distribution of the blood-vessels; the discovery of touch-corpuscles, and the arrangement of the Malpighian cells in the tissue of the cutis by *Meissner,* and their more minute examination by *Tomsa;* and the discovery of muscle-fibres around the hair follicles by *Kölliker.*

The cutis also has been more closely studied as a physiological organ, and especially as the organ of touch and of the perspiratory function.* It has been demonstrated, for instance, by Abernethy

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* *M. Edenhuszen,* under Krause's superintendence (Zeitschrift für rationelle Medicin, 1 Bd.) has made certain experiments in regard to the perspiration by covering the cutaneous surface of various animals with an impermeable coating of gum arabic, lead-oil-varnish, or oil colour. The point which he desired to establish was as to the extent of space which must be left uncovered in order to prevent rapid death. The animals on which he experimented were sheep, rabbits, dogs, pigeons, frogs, &c. The ratio of perspiration, however, varies in different animals, and the results of these experiments can be compared the less exactly as we have also to take into account the variety of means used for the coating, and its modifications.

When the coating is complete, the duration of life depends upon the size of the animal, the normal strength of which is assumed: rabbits die if more than 1-8th or 1-6th of their surface is coated, death being delayed in proportion to that a hand immersed in carbonic acid gas absorbs more than 6·25 cubic inches in one hour. Experiments on animals prove that the absorption of poisonous gases is sufficient to cause death in a short time; for instance, sparrows which are immersed in carbonic acid gas, although their heads are protected, die in 1½ to 2 hours; rabbits in sulphurous acid gas die in 10 minutes; and in the same manner the numerous experiments of *Collard de Martigny*, *Chaussier*, *Lebküchner*, *Nysten*, *Madden*, &c., sufficiently prove the importance of the absorbent function of the skin. The absorption by the skin also can be demonstrated by a coating of tar, as on thus covering the third part of the cutaneous surface, a flow of dark urine is soon produced. The ab-

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the free space left, but the symptoms are similar, although more gradual; in all cases, however, the respiration is most affected. The same relations between total and partial coating subsist in regard to all the other morbid phenomena:—great restlessness, violent trembling, dyspnœa, paralysis, or clonic and tonic spasms, and apathy, to which may be added augmented secretion of urine, and in it the presence of albumen.

The repeated coating of a small portion of skin soon causes reddening, and in the entire thickness of the skin abscesses are formed. On careful examination of these parts numerous triple phosphate crystals are observed, which are also found in the peritoneum of the dead animal. In continuation of these observations, the uncovered parts of the skin were experimented upon with hæmatoxoline paper, which demonstrated the secretion of a volatile alkali. As the blood of coated animals apparently contains a larger amount of ammonia than usual, we may infer that in the normal condition a small quantity of nitrogen is expired through the skin; but it remains doubtful whether this takes place in the form of ammonia. To prevent, therefore, the expiration of this gas is to induce its accumulation in the blood, which produces the well-known morbid phenomena, and necessitates the anatomical changes, which are traceable in dead animals; as, for instance, hyperæmia of the brain, lungs, liver, spleen, and kidneys, effusions in the pleura, pericardium, and cavity of the abdomen, subcutaneous cellular tissue, and variable and considerable ecchymoses of the gastric mucous membrane.

W. Laschkewitsch (Archiv v. Reichert and Dubois Reymond, 1868, 61-67) has quite recently made similar experiments, and in several instances his results are different. He discovered the presence of ammonia in the normal skin, but could not trace this alkali in the blood of coated animals. According to this observer, the theory enunciated by Gerlach and earlier writers, that the suppression of the perspiration induces death by asphyxia, is also untenable, as he immersed animals (the head protected) in hydrogen or carbonic acid gas for six hours without injurious results. On coating the animal, the temperature is lowered in consequence of the distension of the cutaneous vessels: for instance, if two animals of the same size be placed in a calorimeter, the one which has been coated cools sooner and raises the temperature of the water more than the other. On the other hand, animals which have been enveloped in cotton wool, after the coating do not present any special phenomena, as has already been shown by Schiff and Valentin.

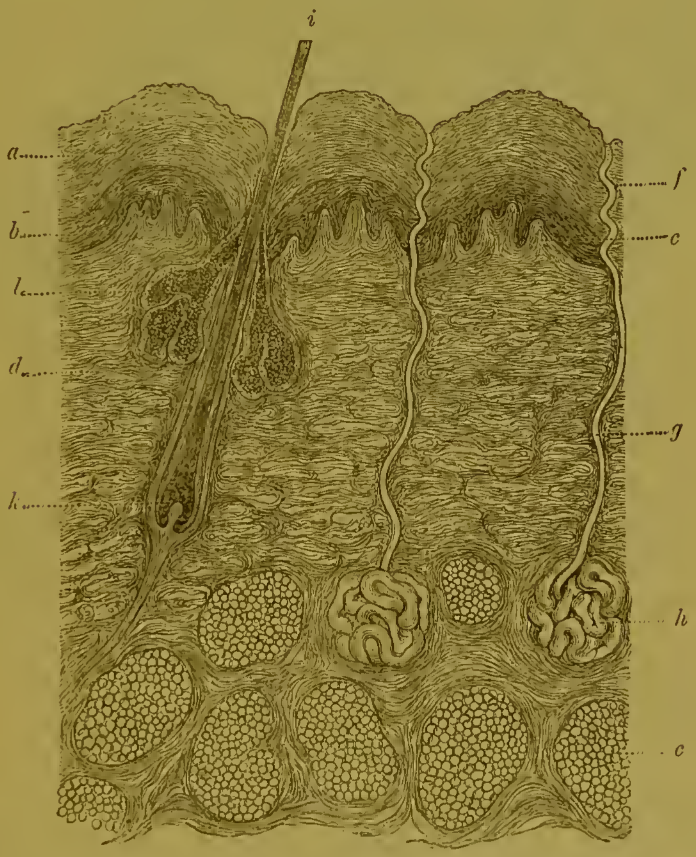
sorption of salt and iodide of potash from surrounding fluid media has also been established in modern times. The cure of syphilis by inunction depends chiefly upon the absorption of metallic mercury by the skin, and experiments which Overbeck made on dogs, clearly showed globular mercury in the cellular tissue of the corium, kidneys, and liver. We should have to enumerate a greater number of names were we here to particularise all these labours. The Vienna school would certainly not be the last, and the studies of *Zeissl*, *Wertheim*, *Reder*, *Biesiadecki*, *Auspitz*, *Pick*, *M. Kohn*, etc., have contributed their share to the progress of dermatology. We have resolved, however, in this work to introduce all the observations which have reference to our branch of science, and which are at least of some importance; we shall endeavour, therefore, to do justice to these authors in the respective chapters.

PART I.—GENERAL.

ANATOMY OF THE SKIN.

THE integument of man, the organ of sensibility and touch, consists of the epidermis, the corium, the subcutaneous cellular tissue, nerves, vessels, sudoriparous and sebaceous glands, as well as hairs and nails.

Fig 1.



Section of normal skin. *a.* Epidermis. *b.* Rete Malpighii (Schleimschicht). *c.* Papillary layer. *d.* Areolar tissue of cutis, Corium. *e.* Panniculus adiposus. *f.* Spiral excretory duct of sudoriparous gland. *g.* Straight part of excretory duct of sudoriparous gland. *h.* Convoluted extremity of sudoriparous gland. *i.* Shaft of a fine hair. *k.* Root of hair. *l.* Sebaceous gland.

CORIUM (*Lederhaut*).

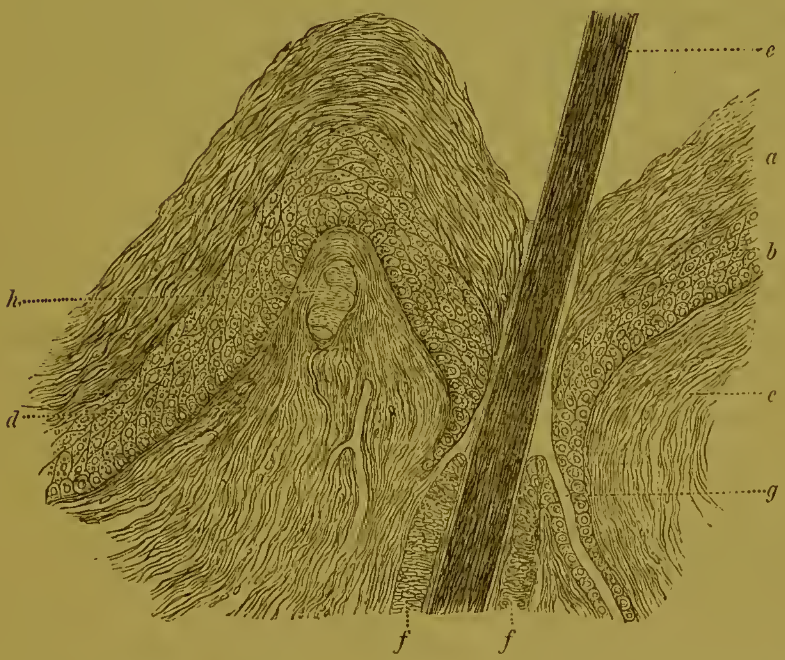
The corium (Fig.1, *d*) is an extremely vascular, dense structure, which is constructed of an interlacement of bundles of connective tissue, along with numerous elastic fibres and connective tissue cells. The interlacement of the fibres in the tactile papillæ and the superficial layer is, however, so intricate that the areolar interstices are obscured, and these parts, therefore, assume a more homogeneous aspect. The corium is covered by the epidermis; it is richly supplied with nerves, contains numerous small bundles of smooth muscular fibre, possesses lymphatic channels, and is traversed by the hairs with their follicles, as also by the excretory ducts of the numerous glands. The thickness of the corium differs considerably on different parts; thus it varies from 0·2 to 1·5‴. It is thinnest on the eyelids, prepuce, glans, and the inner side of the labia majora; somewhat thicker on the face, scrotum, and around the nipples, from 0·3 to 0·5‴; on the forehead, 0·667; and on the general surface of the body the average is from 0·75 to 1‴. It is thickest on the sole of the foot, the breech, the back, and frequently the palm of the hand. In males it is thicker than in females, and thinner in children. The papillæ occur on the entire surface of the skin. On the palm of the hand they are frequently grouped together on ridge-like prominences of the cutis, appearing sometimes singly, sometimes thickly grouped together. The longest, attaining to 0·0667‴, or even to 0·1, occur on the palm of the hand, the sole of the foot, the nipple, etc.; the smallest occur on the face. The larger papillæ are conical or tongue-like in form, the smaller resemble warts or tubercles. Besides the simple, there are to be distinguished compound, *i.e.*, broad eminences, which end in two, rarely in three, projections. On its under surface, the corium becomes blended with the soft (fatty) subcutaneous cellular tissue.

EPIDERMIS AND RETE MALPIGHII.

The epidermis is divisible into a deeper and a more superficial layer, which merge into one another by a more or less marked line of demarcation. The latter is the *epidermis proper*, and the former is termed the *rete Malpighii*. On the parts at which the epidermis sinks between the tactile papillæ and fills up the interspaces, it is of course thicker than on the summits of the papillæ; it thus assumes a cribriform or net-like appearance.

In the deepest layer of the rete Malpighii are situate small cells, measuring from 0·0033 to 0·004‴, of a roundish or long oval aspect, and others of a somewhat greater diameter (0·005‴), with very delicate and indefinite outline, containing nuclei of a more granular character, and frequently of a light yellowish colour, the size of which varies from 0·002 to 0·0033‴, their form being roundish or oval. Hence we find a considerable number of superimposed layers of cells, which in this way gradually become larger (from 0·008 to 0·125‴), assume a polygonal form through pressure, and the nuclei increase in size, but become paler and more lens-formed. In these layers of the rete Malpighii, spinous or furrowed cells occur. Lastly, there appear also the smooth-margined cells of the upper layer of the epidermis proper, or of the so-called horny layer, the size of which varies from 0·125 to 0·02‴. The external layer forms an easily removable, continuous (closely connected) stratum, in the cells of which no nuclei are observable. This absence of nuclei is unimportant, however, as in the young embryo all, even the external minute

Fig. 2.



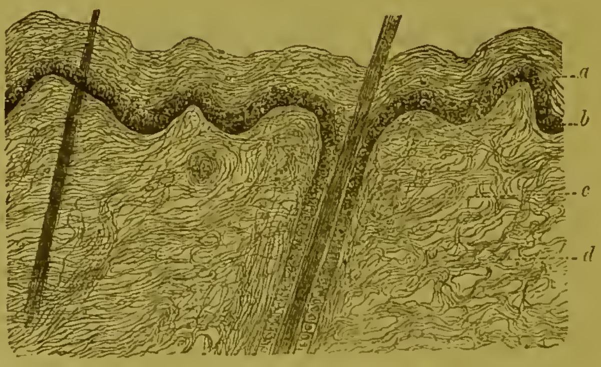
Section of skin (considerably magnified). *a.* Epidermis with flattened horny cells. *b.* Malpighian layer, with oval cells. *c.* Dense tissue of papilla. *d.* Capillary loops of papilla. *e.* Hair-shaft. *ff.* Outer root-sheath. *g.* Excretory duct of sebaceous gland. *h.* Touch-corpuscle.

epidermic scales, are nucleated; as also in adults on parts at which the condition of the skin is softer and more like mucous membrane. As the layers of the epidermis lying upon one another present a whitish or brownish aspect, they consequently modify the bright red colour of the subjacent vascular corium in proportion to their thickness. Thus, on those parts where the colour of the skin is the reddest, as the lips and cheeks, we find the epidermis very thin; conversely on the sole of the foot, and in many people on the palm of the hand, it attains a considerable development, which is accompanied by a progressive decrease of the flesh-red tint, till finally on thickened parts we only find the colour of the epidermic layers: callosities afford instances of this condition. According to Kölliker, the epidermis is developed from the serous layer of the embryo; and even at the fifth week consists of two layers of cells, the rete Malpighii and the epidermis proper: the former gradually increases in thickness, whilst its outer layers are transformed into horny scales.

PIGMENT.

As is well known, the skin of the European presents at some parts a brownish coloration, which is less marked in fair persons, and more so in those of a dark complexion. Among these may be enumerated the nipples, the areola, the scrotum, the labia majora, the neighbourhood of the anus, as also in many individual instances freckles and mother's marks. This condition, which in the white races of mankind occurs only on isolated parts of the surface of the body, presents itself in complete diffusion in the

Fig. 3.



Section of skin of Negro. *a.* Epidermis. *b.* Rete Malpighii. *c.* Pigment of root-sheath. *d.* Corium (consisting chiefly of elastic fibres).

various dark races, from the yellow-brown of the Malay to the deep black of many tribes of Negroes. (Fig. 3, *b*.)

So far as this subject has as yet been investigated, these dark tints (in which the fibrous element of the cutis never participates) would appear to depend upon three conditions, which are associated particularly in the deeper tints of the skin; namely, on a colouring of the nuclei through the agency of a generally diffused pigment; on a similar but much feebler tinting of the entire cell contents; and lastly, on variously-shaped masses or aggregations formed of a dense deposit of molecular pigment in the body of the cell. It is chiefly the deeper layers of the epidermis which participate in these colorations. The superficial layers of the epidermis, like the epithelia of the mucous membranes, undergo a considerable desquamation as the result of friction, washing, pressure of clothes, and such like, and thus their existence is but transitory.

ADIPOSE TISSUE.

THE adipose tissue, as fully developed in a well-nourished body, irrespective of numerous small and variable masses, occurs chiefly in the subcutaneous cellular tissue, which thus becomes the *panniculus adiposus:* the quantity of this latter varies, however, in the different regions of the body. Thus there are abundant accumulations of fat under the skin in the sole of the foot, the palm of the hand, the breech, and the female mammary gland, whilst in the eyelid they are entirely absent.

The extent of these accumulations of fat-cells varies considerably, the rounded contour of the body being due to their moderate development, as panniculus adiposus (Hyrtl). In women and children such accumulations are proportionately more pronounced than in men; in mature age more marked than during youth and old age. The greatest differences in the quantity of fatty tissue are observable according to the corpulency or leanness of the individual: a well-nourished body, however, may rapidly lose its layers of fat as the result of prolonged starvation, exhausting diseases, or dropsical infiltration of the connective tissue, and afterwards, on the return of health, soon regain them. The fact that in emaciated bodies the fatty contents of the cells are absent, whilst the cells themselves are frequently preserved, proves that the latter are permanent structures, in which, when the embonpoint is renewed, the protoplasmic contents are either displaced or changed into a deposit of fat.

NERVES.

THE primitive fibres pass from the nervous plexus to the base of the so-called tactile papillæ (Fig. 2), either singly, or united in microscopic bundles: angular divisions of the nerve-tubes occur more frequently in this situation.* The touch-corpuscles occur on the palmar surfaces of the fingers and toes, the palm of the hand, and sole of the foot, as well as the heel: in greatest number on the flexor surface of the last joint of the finger, less numerous on the second, still less on the third joint, and especially scarce in the palm of the hand. Thus Meissner calculates on the last finger joint for the □‴ 400 papillæ, 108 with touch-corpuscles, whilst on the second only 40, on the first 15, and 8 on the palm of the hand: their number is also proportionately greatest on the last joint of the toe. The foot, however, is less richly supplied than the hand. On the dorsal surfaces of the hand and foot scattered touch-corpuscles occur, as also on the flexor surface of the forearm: on the nipples also in moderate number, and on the lips; in the latter situation their termination in club-shaped extremities has been described. Amongst the mammalia, touch-corpuscles have hitherto been found only in the apes. The form and size of the touch-corpuscles are variable: thus in the palm of the hand they measure from 0·05‴, their breadth being from 0·02 to 0·025‴; the smaller corpuscles from 0.02 to 0·167‴. In general, the larger diameter is associated with an oval, the smaller with a roundish contour. The touch-corpuscles are found in the axis of the upper part of the tactile papillæ; whilst in the compound papillæ they may be found at the side. The latter only may exceptionally contain a loop of vessels; the papillæ with touch-corpuscles are non-vascular. The structure of the touch-corpuscle (Frey) consists of a homogeneous capsule, and, on transverse section, soft finely-granulated contents are to be observed within it. In the capsule there are to be distinguished numerous elongated corpuscles, transversely or obliquely placed, which give the whole structure a well-marked striated aspect. The nerve fibres pass directly in pairs, sometimes, however, in groups to the structure, surrounded by simple neurilemma, which merges uninterruptedly into the capsule. These fibres have a dark outline, 0·002‴ or less in breadth, and pass sometimes into the base of the touch-corpuscle, sometimes into its lateral aspect. The "terminal loops" of many earlier observers do not accord with the single or triple nerve-fibres passing into the touch-corpuscles. There is sometimes, however, a peculiar loop-like envelopment of the touch-corpuscle by the nerve-tubes, or the latter may run directly for a shorter or longer distance over the corpuscle: lastly, they all enter into the interior of the corpuscle, but in what manner they terminate in it has not yet been discovered. It is probable that they radiate, after the manner of the terminal dilatations of Krause, as pale filaments, devoid of medulla. Whether the above-mentioned transverse nuclear-like bodies coincide with the nerve-terminations must also be left undetermined.

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* *Langerhans* (44 B. Virch. Archiv) describes club-shaped structures in the Malpighian layer from which fine filaments are given off, which he has made visible by chloride of gold. The nervous character of these bodies is, however, not yet fully established.

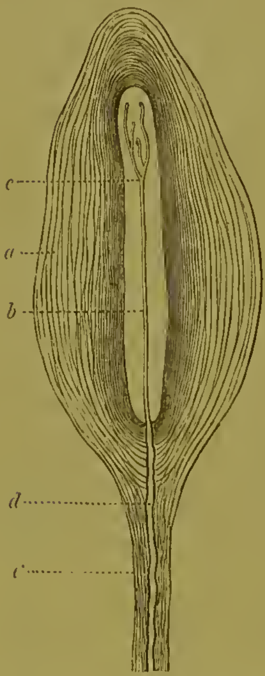
Podcopaëw (Arch. f. Mikr. Anatom. 5 B. 4 H.) has confirmed these observations by his experiments with a solution of chloride of gold on the skin of rabbits; he also observed the nervous filaments between the cells of the rete M. both in their connection with the network under the latter, and also with those of the epithelial cells. The sub-epithelial nervous network is formed of long fibres (devoid of medulla), in which nuclei are laterally embedded. He also traced nerve-fibres, which terminated between the rete M. and the epidermis, and which here either branched out, or showed sinuous expansions. Whether this expansion is the termination of the fibre is not yet known. Fine fibres (as have been described by Langerhans) also pass from the nervous plexus around the hair-bulb to the outer root-sheath. Tomsa (Centralbl. u. Med. Wochenschr. 1869, 36) experimented on fresh portions of human skin with chloride of gold and boiling with 5 per cent. of acetic acid, by which process the epidermis was separated from the papillary layer of the cutis, and he found filaments passing from the (marklosen) nervous plexus of the latter towards the papillæ and capillaries of the tactile papillæ. These filaments form a plexus around the capillaries, from which fine filaments extend into the capillary wall.

Tomsa supposes that during its course the finest nerve-fibre loses its medullary sheath, and by the development of spindle-shaped nuclei a terminal ganglionic structure is formed. These fibres, which retain the medullary substance, pass, as independent filaments, without division or lateral communication, to the surface of the skin. At this point many of them approach the touch-corpuscle, so that they increase in thickness, and unite themselves by spiral windings to the latter structure. This arrangement appears especially on the fingers and extensor surfaces generally, whilst it sometimes happens that the fibre maintains its original thickness, and after a tortuous course, splits into a varying number of prolongations, which appear polygonal on transverse section. The latter course is observed chiefly on the palm of the hand. The fibres, which are provided with nuclei, but in which the medulla is absent, are directed towards the surface of the skin, gradually increase in breadth, and terminate in a ganglionic cell.

The *Pacinian corpuscles* are elliptical or club-shaped structures;

measuring from 0·5 to 1‴ or more; enveloped in numerous capsules, formed of concentric connective tissue. These bodies appear to the naked eye stretched and semi-transparent, with a white axial line. In man they occur on the cutaneous nerves of the palm of the hand and sole of the foot, numerously on the nerves of the fingers and toes, and most abundantly on those of the last joint of the latter; also in the sympathetic nervous plexus, surrounding the abdominal aorta. At other parts they occur only sparingly: their number on the four limbs of man has been calculated from 600 to 1400. In the mammalia generally these Pacinian bodies are found chiefly on the sole of the foot: in the mesentery of the cat they are beautifully seen, more or less numerously distributed; and in birds they are also found, although in a modified form.

Fig. 4.



Pacinian body. *a.* Membrane of capsule. *b.* Inner nerve-tube. *c.* Bifid extremity of nerve. *d.* Axial cylinder. *e.* Wall of axial cavity.

The membranes composing the capsule (*a*) are to be regarded as formed of connective tissue, the matrix being either homogeneous and striated, or furnished with elongated nuclei or cells. Hoyer has lately observed (by means of tinting with silver) a mosaic-like epithelium on the inner surface of these membranes. The series of capsules are traversed by a scanty vascular network, are more widely separated in the external portions, and correspond in their curvature to that of the entire structure. Those situated more internally are closely approximated, and being less curved, surround the axial canal, which latter consists of a homogeneous nucleated form of connective tissue.

The internal canal (Innenkolben) is rounded off at its upper extremity; towards the lower pole its wall is prolonged, like the capsules, into a pedicle, to which the Pacinian body is attached like a berry. The pedicle consists for the most part of longitudinally-arranged connective tissue (according to Michelson, of a somewhat glistening and finely granulated protoplasmic substance without nuclei, which is coloured yellow by chromic acid), and forms the neurilemma of the nerve-fibre, which enters the structure and terminates in it. The latter has a thickness of from 0·0063 to 0·005″

and less, as well as the usual medullated aspect. The fibre thus reaches the Pacinian body, and enters its lower pole in order to arrive at the central canal, the axis of which it occupies. In its passage to this axial situation the fibre loses its dark borders (as occurs in the dilatations "Endkolben" of Krause), and finally ends, after considerable diminution, as a pale terminal filament, which latter traverses the entire central canal, and terminates close to its roof in one or several delicate knot-like expansions (*c*).

The nerve-fibre is liable, however, to divisions previous to its entrance into the Pacinian body, and the terminal filament may also be seen to divide into two or three branches; a splitting in which the axial canal may also participate. It seldom happens that two nerve-fibres enter the same corpuscle, to terminate either divided or undivided in a single central canal (Kölliker).* The discoveries of Wagner, Meissner, and Krause leave scarcely any doubt that the Pacinian bodies are to be regarded as a sensitive nerve-apparatus.

Distribution of nerves. The researches of L. Türk have demonstrated certain "areas of sensibility" on the cutaneous surface, some of which are supplied exclusively by one pair of spinal nerves, others by two or three pairs; these are discovered by careful experiment.

BLOOD-VESSELS.

The skin receives its blood-vessels from the arterial and venous branches of the subcutaneous cellular tissue, which extend towards the surface, and send neighbouring offshoots to the corium, the hair-follicles, and the sebaceous and sudoriparous glands. In the corium itself there is a well-developed meshwork of minute capillaries, measuring from 0·0034 to 0·005‴, which spreads out and supplies with loops (measuring from 0·004‴) the greater part of the tactile papillæ, with the exception of those isolated spots where the papillæ are provided with touch-corpuscles, and consequently remain non-vascular.

LYMPHATIC VESSELS.

The lymphatic vessels of the skin, already recognised by earlier observers as a dense network, have lately been described and figured by Teichmann. These occur most abundantly where the skin is loose and wrinkled, and where it is subjected to extensive stretching and contraction, as, for instance, in the scrotum, and more especially on those parts of the surface which are provided with large papillæ. There is to be distinguished a deeper and a more superficial network of lymphatic vessels, the former being of wider calibre and meshes than the latter; such a distinction, however, does not everywhere exist. In morbidly enlarged papillæ Teichmann found an axial canal, somewhat resembling the lymphatic vessel of an intestinal villus. According to his observations, the structures which do not possess lymphatic vessels are the subcutaneous and fatty cellular tissue, sudoriparous and sebaceous glands, and the hair-follicles *

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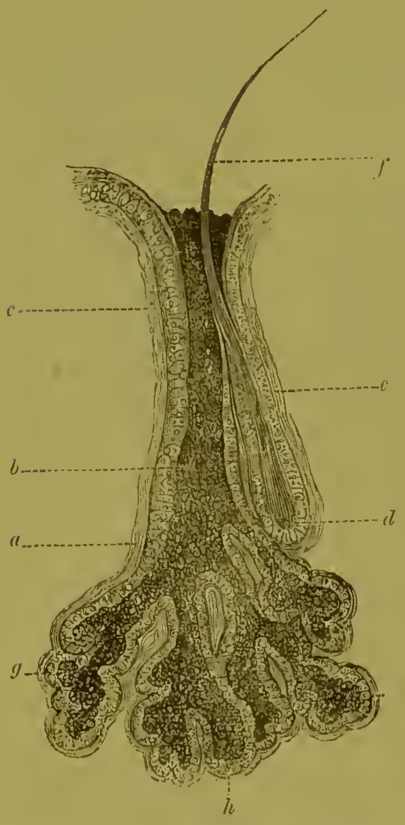
* P. Michelson (Archiv für Mikroskopische Anatomie, 1869) has differently interpreted the structure of the elements of the Pacinian body.

SEBACEOUS GLANDS.

The follicles of the sebaceous glands (Fig. 6) are lined with cells which may be regarded as a modified prolongation of the Malpighian layer of the cutis, but which are distinguished from the latter by a certain abundance of fatty molecules.

Fig. 5.



Sebaceous gland. *a.* Surrounding cellular tissue. *b.* Smegna. *c. h.* Fat-secreting cells. *d.* Root of fine hair. *e.* Hair-follicle. *f.* Hair-shaft. *g.* Acini of sebaceous gland.

By a further deposit of fat, the cell enlarges, separates from the *membrana propria*, so that in the cavity of the follicle, cells measuring from 0·167 to 0·025‴ are met with, which are richly supplied with fat; in consequence of which the fat presents itself either in nuclei or fat molecules, or as a continuous mass, giving it the aspect of an ordinary fat-cell. The nuclei, as also their covering, would appear to undergo a gradual degeneration, and thus the sebaceous matter of the skin presents itself either as free fat, or in the form of the adipose cells just described. The problem regarding the mode of development of the fat from the protoplasm of the cells has not as yet been solved.

The sebaceous glands (Glandulæ sebaceæ) are small structures, belonging to the group of racemose glands, which occur almost over the entire integument, although more limited in their distribution than the sweat-glands; their secretion is essentially fatty. The sebaceous glands, which are always limited to the corium, never extending to the subcutaneous cellular tissue, are, as a rule, associated with the larger as well as the smaller hairs of the body, into the follicles of which they open either singly or in groups. Whilst these glands appear as lateral appendages to the larger hair-follicles, the smaller follicles, on the other hand, appear rather as appendages to the glands. On those parts of the body which are not provided with hair, there are also sebaceous glands, which open directly on the surface: the glands are almost entirely wanting, however, on the palm of the hand, the sole of the foot, and the last joints of the fingers and toes: they occur but sparingly on isolated spots of the generative organs, namely, on the prepuce and glans of the male, and the labia minora of the female. The structure of the sebaceous glands (the size of which varies from 0·1 even to 1‴) is also subject to modifications; thus small glands of the simplest kind form short and wide saccules, whilst others display isolated expansions at the deeper part, assuming an elongated flask-like or a more rounded aspect. These glandular follicles, which consequently differ in length, vary also in transverse diameter from 0·025 even to 1‴: the largest occur on the nose, the scrotum, the mons Veneris, and the labia majora. The membrane of which the follicle and duct are formed is not clear and structureless, as in other glands, but consists of striated connective tissue. Blood-vessels do not usually surround the body of the gland. The secretive power seems on the whole to be inconsiderable, as the function consists in a rather superficial lubrication of the hair and of the surface of the skin.

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* *Young* (Sitzungsberichte d. Kaiserl. Akademie, B. 57) has demonstrated the existence of the lymphatic vessels in the œdematous cutis by injecting a solution

The sebaceous secretion (sebum cutaneum) forms, when fresh, a thick oleaginous mass, which after some time becomes consistent, like tallow: its chemical constituents, with which are associated a variable quantity of epidermal scales, irrespective of certain differ-

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of silver, which rendered visible the well-known epithelial silver tracings on the walls of the blood-vessels: his results fully confirm those of Teichmann. He also accepts the existence of a definite lymphatic system of vessels, in opposition to the opinion of those who do not recognise such distinct lymphatic channels (Lymphräume). The definite lymphatic system was demonstrated in the skin of the frog several years ago by C. Langer, the means employed being coloured injections. The same observer has recently found ramifying lymphatic vessels in the tail of the tadpole, similar to those which S. Stricker has described on the capillaries, and which he associated with the development of those vessels.

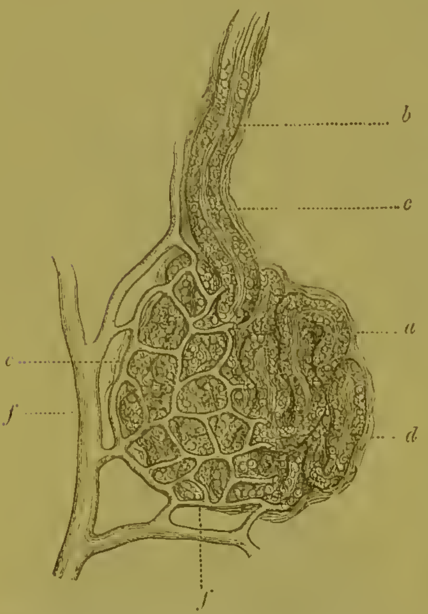
ences in several parts of the skin, are essentially a large quantity of neutral fat, to which saponaceous combinations, cholesterine, and a protein body are united. Amongst the inorganic constituents of this secretion the earthy phosphates are prominent, whilst chlorate of potash and the alkaline phosphates are diminished.

Development. The sebaceous glands are developed from the outer root-sheath of the hair-follicle between the fourth and fifth month of fœtal life. They appear at first as wart-like outgrowths, which gradually become pear or flask-shaped structures, in which a cavity is formed by the physiological fatty change which the innermost cells undergo: this fat is the first secretion, and is discharged as sebum into the hair-follicles.

SUDORIPAROUS GLANDS.

The convoluted extremity of the sudoriparous gland is situated either in the deepest layer of the corium, or more usually in the subcutaneous cellular tissue, deeper than the hair-follicles, and surrounded by the fat-cells of the panniculus adiposus. The excretory duct, longer or shorter according to the thickness of the skin, traverses the corium, and passes outwards from this between the neighbouring papillæ to the epidermis, in which it assumes a tortuous course. The openings of the ducts on the surface of the skin are of microscopic minuteness, with the exception of those on the hand and sole of the foot, where they are widened and funnel-shaped. Here they appear in linearly disposed points on the ridges of the skin; at other parts these openings occur irregularly grouped.

Fig. 6.



Sudoriparous gland (considerably magnified). *a.* Convoluted extremity, with secreting cells (epithelium). *b.* Excretory duct of gland. *c.* Cavity of excretory duct. *d.* Connective tissue capsule. *e.* Artery of sudoriparous gland. *f f*, Arterial branches, merging into capillary network.

The contents of the sweat-glands are composed either of a single or double layer of minute polygonal secreting cells (*a*), measuring from 0·005 to 0·0067‴ the protoplasm of which often contains ordinary molecular, brownish, pigmentary matter, as well as neutral fats. The canal in the axis of the excretory duct (*b*) contains either a clear non-granular liquid, or, as in the case of larger convoluted glands, a thicker molecular mass, rich in albumen and fat, which owes its origin to the transformation of the protoplasm of the secreting cells, and resembles the fatty secretion of the (nearly related) ceruminous glands of the ear, or of the racemose sebaceous glands. The vessels (*e*, *f*, *f*,) form a delicate interlaced network round the convoluted extremity of the gland: nerves at this part have not as yet been discovered, although the influence of the nervous system on the mechanism of secretion is probably similar to that which occurs in the salivary glands.

The sweat-glands occur, with the exception of several isolated spots, over the entire integument, whether covered with hair or not; but their arrangement, size, and number, undergo considerable variations on the different localities: on the palm of the hand and sole of the foot these glands are somewhat regularly disposed in rows on the ridges of the skin; on most parts, however, they appear in small irregular groups, which are separated by patches of skin, variable in size, and destitute of glands: thus on the lips they extend to the red margin; on the nose, to the orifices of the nostrils; on the penis, to the border of the outer surface of the prepuce; and on the labia majora, also to the junction of the skin with the mucous membrane. The smaller gland formation is apparent on nearly the entire cutaneous surface, with the exception of the axilla, where the larger and complicated flask-like structures occur, closely approximated, and form a regular layer. Krause has collected some interesting observations relating to the number of the sweat-glands: thus, the skin of the neck, back, and breech contains on the average 407 in the □″, whilst the following parts may be enumerated as examples:—

Cheeks	548
Inner surface of upper and lower limbs	566
Outer surface of forearm	1093
Inner surface	1123
Chest and abdomen	1136
Forehead	1258
Back of hands	1490
Palm of hands	2736
Sole of foot	2685

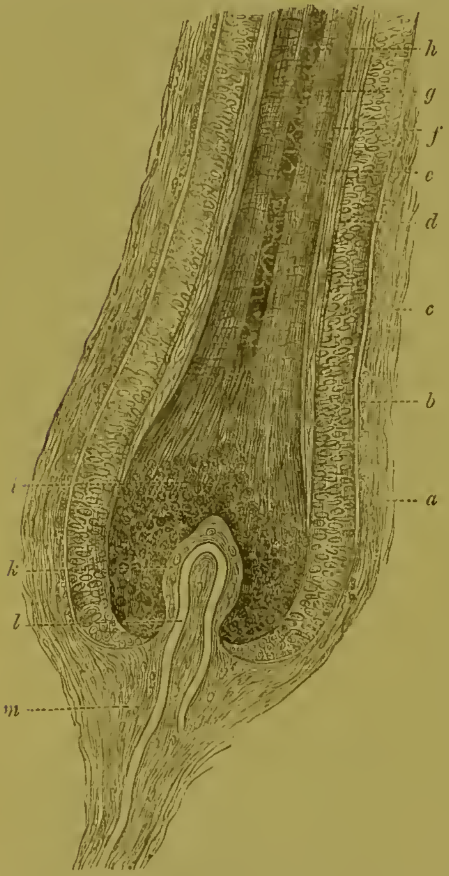
A calculation of the entire surface of the body afforded the same observer an aggregate of 2,381,248 of these glands; there is no doubt, however, that considerable variations occur in individual instances.

According to Kölliker, the sweat-glands are developed about the fifth month of fœtal life; appearing originally as small flask-shaped outgrowths of the cells of the Malpighian layer, and in the following months extending deeper through the skin, and gradually assuming a curved or hook-like form at the lower end: at this time appears the first indication of the axial canal in the cell mass, and of the formation of its external opening.

HAIRS.

The hairs (fig. 7) are products of the horny layer, and present thread-like structures of somewhat complicated formation, consisting of a modified epidermic tissue.

Fig. 7.



Hair. *a*. Hair-follicle. *b*. Clear inner layer. *c*. Outer root-sheath. *d*. Inner root-sheath. *e*. Cuticle of hair. *f*. Cortical substance. *g*. Hair-shaft. *h*. Medullary substance. *i*. Root. *k*. Papilla with hair-bulb, *l*. Capillary loop. *m*. Prolongation of hair-follicle inferiorly.

There is to be distinguished the *shaft* of the hair (*g*), which projects for the greater part of its extent beyond the surface of the skin, terminating in a point. The lower part of the hair, the *root* (*i*), is inserted in the skin, terminating in a flask-shaped depression of the latter, the *hair-follicle* (*a*), with a knob-like enlargement, the *hair-bulb*. The latter is furnished with an infundibuliform excavation, and rests on a papilla (*k*), which arises from the base of the follicle. Between the follicle and the hair there is an intricate enveloping structure, the *root-sheath* in which may be discriminated an outer (*c*) and an inner layer (*d*). The hair-follicle is an obliquely placed indentation of the corium, of variable length, and, in the case of large hairs, extending into the subcutaneous areolar tissue; its form is usually cylindrical, being frequently narrowed towards the lower blind extremity. The hair-follicle, like the corium, is formed of fibres of connective tissue, in which several layers may be discriminated, and with which are united externally bundles of smooth muscular fibre (*arrectores pili* or muscles of the hair-follicle). The outer layer of the hair-follicle presents longitudinally arranged connective tissue with spindle-shaped nuclei; its thickness varying from 0·0016 to 0·0031‴; on it there is a moderately developed capillary network, as also separate nerves. The papilla of the hair, formed of fibrous or undeveloped nuclear cellular tissue, rises from the deeper part of the follicle, and must be regarded as a modified tactile papilla of the skin; its form is conical or oval.

G. Wertheim observes, that the areolar tissue of the hair-follicle does not terminate at the deeper part, but is prolonged as a band (*m*), extending to form a connective-tissue bundle in the corium; this prolongation bearing the same relation to the hair-follicle as the stalk to the corolla of the flower. From the three layers of the hair-follicle, the exterior longitudinal, and the middle circular fibres of the skin, merge into the band, and for a short distance also the inner fibres.

The papillæ, containing in their interior a loop of vessels, are to be regarded as the formative and nutritive structures of the hair. In the same manner as the hair-follicle is an inverted portion of the corium, so is the outer root-sheath the everted layer of the rete Malpighii: as to the signification of the *inner* root-sheath, conflicting opinions are still entertained.

The hair-bulb presents throughout its entire mass small roundish and compressed cells, similar to those which form the outer root-sheath. These cells contain either colourless molecules or nuclear pigment, according to the colour of the hair, either in larger or smaller masses: they also undergo a transformation towards the upper part, and in many hairs a distinction thus results between the axial and the peripheral portion, or the medullary and cortical substance. On examination of the cortical layer (*f*) *en masse*, it is found to be saturated with pigmentary matter, the tint of which varies according to the colour of the hair; in this way the hair is traversed by distinct and irregular longitudinal lines, which represent the limits of the neighbouring hair-shoots or are derived from the streaks of nucleated pigment, and appear more extensively in hair of darker tints. In consequence of the dry and hard condition of the hair-shaft, it is penetrated by air-bubbles, which, in considerable number, occupy small longitudinal spaces between the lamellæ. From the deepest part of the hair, there is a peculiarly thin enveloping layer which, in its upper part, forms the covering or cuticle of the hair (*c*).

The medullary substance (*h*) does not form an integral part of the structure of the hair, as it is generally wanting in the fine hairs, and either entirely or partly absent in those of the head: it appears as a streak occupying a third or a fourth part of the bulk of the hair.

Hairs occur over the entire integumentary surface, with the exception of the following parts:—the outer surface of the upper eyelid, lips, palm of the hand, and sole of the foot, as also on the dorsal surface of the last joints of the fingers and toes, and on the inner surface of the prepuce and glans. In the quantity of the hairs, marked variations occur, as also in their thickness, measuring even from 0·006 to 0·06‴. There are to be distinguished fine and flexible (lanugo), and thick and rigid hairs, between which there is no sharp line of demarcation: the thickest are the hairs of the beard and pubes. The length of the hair varies considerably, from 1 to 2‴ of fine hairs, to 3 and 4′, as in the hair of the head of women.

Some hairs remain short, notwithstanding their thickness, as, for instance, the eye-brows (supercilia), the eye-lashes (cilia), and the hairs of the nostrils (vibrissæ). The straight, or curled condition of the hair, depends on the form of the shaft, which, in the former, appears on tranverse section roundish, in the latter oval, or even kidney-shaped.

The hairs appear singly, in pairs, or in small groups. The oblique direction of the follicles produces varied groupings in particular localities. The number of hairs on separate regions of the body varies in a marked degree; thus it has been calculated that there are on the fourth part of a square inch of the scalp 293; of the beard, 39; and of the anterior surface of the thigh, 13 fine hairs; there are doubtless, however, variations in individual instances. The hairs exhibit marked strength and elasticity, which render them capable of bearing a considerable strain, and of reassuming their original length, provided the tension is not excessive. Owing to their dry and horny condition, hairs are amongst the most lasting parts of the body, as shown by the hair of mummies. The moisture of the atmosphere is readily absorbed by the hair, as also the surrounding fluids by the bulb: on the latter process depends the marked change which takes place in the apparently dry substance of the shaft, as is demonstrated by cases in which the hair turns suddenly grey. The accumulation of air in the medullary substance is associated with a drying process: the hair-shaft is also saturated with the fatty matter of the sebaceous glands. As Henle has justly observed, the pathological or physiological condition of the skin is indicated either by the brittleness of the hair, or its soft, elastic, and glistening aspect.

The hair in its nutrition and growth resembles the nail: thus a cell growth takes place in the deeper and softest part of the hair-bulb, maintained by the blood-vessels of the follicle, and especially by the formative material supplied to the papilla. The growth of the hair is favoured by cutting and shaving, but if left in its natural condition it attains only a definite length: it may also be perfectly restored when the follicle is not destroyed. The hair is believed to grow more rapidly during the day than the night, and in warm rather than in cold weather.

Development. The development of the hairs commences at the end of the third or beginning of the fourth month of fœtal life, by the formation of small plug-shaped growths on the interior of the mucous layer of the epidermis, the so-called hair-shoots (the origin of the hairs and their follicles), *i.e.* of the root-sheaths: these become enveloped in saccules of the cutis, viz., the hair-follicles. In the growth of the mucous layer and epidermis the hair papilla (which is provided with capillary loops at an early period) is developed from the cutis by the formation of flask-like prolongations. At this time, also, the epidermal cells of the embryonic hair exhibit two layers—an inner, the elements of which become prolonged, and an outer, the cells of which remain connected with those of the mucous layer, and form the outer root-sheath. The inner stratum is again subdivided into two layers. the hair and the inner root-sheath. The growth of the minute hairs thus formed commences on the head and the eyebrows about the end of the fifth month, and on the extremities from the twenty-third to the twenty-fifth week. This growth continues until the end of fœtal life, during which, however, the hairs are shed, and a new growth takes place soon after birth.*

MUSCLES OF THE SKIN.

The area of distribution of the organic muscular fibres is, according to my observations, as follows:—The *arrectores pili* occur either on one or on both sides of the hair-follicle, frequently branch

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* A Götte (Arch. für Mikrosk. Anat. IV., 273) has recently contributed the following interesting observations on the development of hair.

At first there arises a circumscribed papillary growth of the cutis, the cell-growth being sharply defined from the connective tissue of the latter. The epidermis is thus raised into a small eminence, which, however, soon disappears, inasmuch as a growth from the rete M. takes place, which surrounds and depresses the papilla of the cutis. The epidermis and cutis are separated by a homogeneous membrane, on which rests the deepest layer of the rete M., consisting of cylindrical cells, with superimposed roundish cells. The structureless membrane, along with the adjacent cylindrical and spherical cells of the rete M., are continuous with the matrix of the hair. As the mucous layer is prolonged towards the deeper stratum, it becomes slightly narrowed over the papilla, and dichotomously, and are distributed in the uppermost layer of the corium: the principal mass (Hauptstamm) subdivides into several fasciculi, which latter interlace abundantly, and form a network. These muscular fibres extend upwards as parallel bands, in groups of three or four, which are distributed either separately or united; others pass from the upper part of the corium to the panniculus adiposus, divide numerously, and branch into horizontal and vertical fasciculi. There are also fasciculi extending horizontally both above and below the sudoriparous glands (especially on those of the scalp) and in the axilla. In the upper layer of the corium occur also horizontal broad extensions of the muscular fibres: on careful removal of the epidermis, and by making fine transverse sections, the course of these fibres under the papillæ can be distinctly traced.

The occurrence of these muscular fibres varies as to individuals and localities: the existence of numerous muscles does not depend

at the same time its upper portion increases in thickness. At this time a rapid growth proceeds from the papilla, which initiates the rudiments of the shaft and inner sheath. At the periphery of this papilla elongated cells are formed, which soon extend in the form of a cone into the interior of the epithelial process. This conical structure, which originates in the papilla, presents the rudiments of the hair and of the inner sheath; while the surrounding investment derived from the inversion of the epidermis, presents those of the external sheath. The central cells of the cone become developed into fibres; and there is soon observed a differentiation of the cone into a central part (the hair shaft), and a peripheral (the inner sheath). The margins of the point are the first to become horny; in the centre of the cone the shaft of the hair then makes its appearance, which also becomes horny from the point downward, and terminates in a clear knob-like structure at the summit of the papilla (the hair-bulb). In man, Götte distinguishes two kinds of hair-formation, the primary and the intermediate. The former seems to occur chiefly on the down-covered parts of adults, although comparatively rare. The intermediate hair-formation exhibits similar primary developmental steps; the first rudiments of the hair being similar to those of the embryo. In this matrix a hair then appears independent of, and separate from, the papilla; this hair is formed by an elongation and horny change of the cylindrical cells, commencing from the lateral wall. This hair, which, from the absence of a papilla and fully formed inner sheath is incomplete, Götte terms an *intermediate* hair; and that which sooner or later arises beneath it from the papilla (precisely like the hair-formation in the embryo), he terms *secondary* hair. The intermediate hairs seldom attain any considerable length, as they are soon supplanted by the secondary hair. In general they remain colourless, even in the negro, until they have attained a certain size, whilst the secondary hairs on the same situations exhibit from the first a marked coloration. The falling out of hair in adults is caused by the cessation of growth of the cuticle and horny layers of the shaft, the result of which is separation of the fibres. As a new cell growth does not take place, the destructive process extends to the bulb. The papilla shrivels up, and becomes separated from the follicle.

upon general physical strength, since I found the *arrectores pili* in young emaciated subjects as numerously and strongly developed as in robust individuals; and in regard to localities, the following may be enumerated in the order of frequency:—scrotum, penis, anterior part of perinæum, scalp, forearm, thigh, upper arm, shoulder, forehead, belly, axilla, calf, face, palmar and dorsal surface of hands and feet: on the flexor surfaces of the extremities they are less developed than on the extensor.

Physiological action. By the contraction of these muscles the blood is expelled from the capillaries, and forced from the surface to the deeper parts of the skin, whereby the temperature of the surface is diminished: on the cessation of cold the contraction also ceases; further, the cutaneous muscles, which are distributed on the surface of the corium, shrink towards their points of insertion during the contraction of the skin; in the same manner the fasciculi, which extend transversely and vertically, also undergo considerable depression; the surface thus becomes contracted. Secondarily, as the result of the contraction of the organic muscular fibres, a considerable change takes place in the condition of the circulation: partly on account of too powerful contraction, the stream of blood through the smaller arteries will be lessened, and partly also the return of the blood will be interfered with. The cutaneous muscles thus at the same time regulate the condition of the circulation, as also the augmented or diminished tension of the skin. It would appear that on those parts of the skin where abundant elastic tissue occurs (the scalp and extensor surfaces of the extremities), these organic muscular fibres are more extensively and powerfully developed. The secretions of the sudoriparous and sebaceous glands are doubtless influenced by these muscles, as by the contraction of the latter the secretions are expelled.

NAILS.

The nail is a hard, compact, and smooth structure of more or less concave and rounded quadrilateral form: it is more bent at the sides, and thicker on the free anterior edge, than towards the root: the anterior is the only free edge, the sides being embedded in a fold of the skin, which commences on the point of the finger as a flattened fossa, and gradually deepens towards the matrix. The inferior portion of the nail is embedded in a deep fold, measuring from 2‴, and is termed the *root*, whilst the fossæ are designated the *folds of the nail*, and the underlying portion of the corium, the *bed of the nail*. The latter derives its form from the nail and its folds, and so intimate a connection exists, that maceration or scalding is necessary in order to separate them.

On examination of the exposed bed of the nail, the corium presents longitudinal ridges, on which separate papillæ are found; the latter are more thickly grouped under the root, but appear smaller. The two parts of the bed of the nail are distinctly separated from one another by a convex line, which appears as a white border through the transparent tissue, the so-called *lunula*. The serrated prolongations of the Malpighian layer sink into the interspaces of the cutaneous ridges, as on other parts of the skin: in the negro, according to Krause, the nuclei of the Malpighian cells contain the same dark-brown pigment as in the cutis. In general it is to be observed that the deeper layer of the epidermis sinks into the rete Malpighi with small serrations, and also that the root of the nail is considerably thinner and softer than the free portion. The epidermis on the inferior fold of the nail becomes blended with the anterior surface in the same manner as that of the point of the finger loses itself under the free border. In chemical composition the nail resembles the horny layer of the epidermis, differing from it only in greater hardness and solidity.

The tissue of the nail is supplied by the blood-vessels of the bed and fold, and ordinarily exhibits an active growth, which considerably exceeds the waste which takes place on the free edge: it would appear that this growth attains only a certain limit, as is seen in people who, like the Chinese, do not cut the nails. The regenerative process takes place more rapidly in childhood than in old age; and more actively in summer than in winter. The growth of the nails appears to differ on each separate finger. In regard to the process of growth, the deeper cells of the Malpighian layer maintain their original situation, the epidermis being extended over the soft cellular layers by the formation of new cells, which become converted into horny scales at the deeper part of the root.

PATHOLOGY OF THE SKIN.

I.—FORMS OF EFFLORESCENCE.

The forms in which skin diseases appear are the following:—

1. *Maculæ,* stains: these are discolorations of the skin, arising from hyperæmia of the superficial layer of the papillary body (erythema); from exudation (roseola syphilitica); from hæmorrhage (purpura); or from excessive deposit of pigment (ephelides); and deficiency of pigment (albinismus partialis).

2. *Papulæ,* papules: these are projections above the surface of the skin, which are produced by a variety of causes: *a.* by an inflammation of a circumscribed portion of the papillary body (syphillis papulosa), the exudation consisting chiefly of serum or of cells. At first the papules appear redder than the surrounding skin in consequence of hyperæmia; but when the exudation involves the blood-vessels, the colour becomes paler: *b.* papules produced by limited effusion of blood (purpura papulosa); *c.* by the accumulation of sebum in the sebaceous follicle (milium); *d.* by an inflammation of the follicle (acne); *e.* by accumulated masses of epidermis (psoriasis punctata); *f.* papules produced by a new cell growth (lupus).

3. *Tubercula,* tubercles: these are caused by a considerable infiltration of the corium, extending to the subcutaneous cellular tissue, their size varying between a pea and a nut (furunculus); tubercles are also produced by a new cell-growth (sarcoma, carcinoma).

4. *Phyma,* tumours: these are swellings in size between a walnut and a man's fist, which both project above the surface, and extend into the deeper layers of the integument (rhinophyma molluscum).

5. *Pomphi,* wheals: these are flattened inflammatory infiltrations, the superficial area of which exceeds the thickness: in form they are either circinate, spherical, or irregular: the small wheals are generally red, the larger paler in the centre, and surrounded by a red ring. The wheal is an acute inflammatory œdema of the papillary body. The red margin is probably produced by the

blood being driven to the periphery by the accumulated serous fluid, or the entrance of the blood into the affected part being impeded by the exudation. The most typical form of wheals is seen in urticaria.

6. *Vesiculæ*, vesicles: these are elevations of the epidermis, which are produced by serous exudation in the superficial portion of the cutis, the epidermis being elevated by an exudation betwixt the horny and mucous layers; the involved spindle-shaped epidermic cells form septa or strands, which numerously traverse the cavity of the vesicle (herpes, sudamina).

7. *Bullæ*, blebs: these are distinguished from vesicles by their greater size, their contents being either serous, sero-purulent (pemphigus), or hæmorrhagic.

The origin of blebs and vesicles is explained as follows (Rindfleisch):—The exuded fluid of the papillary vessels passes freely the mucous layer of the epidermis, its further progress being arrested by the horny layer. The contents of bullæ consist at first of transparent lymph, which, after a time assumes the character of gelatine, and later of pus. On cutting off the raised epidermis of a large bulla, the surface of the skin presents itself as a whitish network, the meshes of which are marked with red points, which latter answer to the hyperæmic papillæ, the white network being the remainder of the epidermis denuded of its horny layer, forming a thick stratum between, as well as on the summits of, the papillæ (see Herpes zoster).

8. *Pustulæ*, pustules: these are elevations of the epidermis, formed by the accumulation of pus, which originate either in the cutaneous glands (acne), the substance of the corium (furunculus), the papillary body (impetigo), or between the mucous and horny layers (variola); in the latter case the exudation is at first serous. The contents of bullæ are rendered turbid by pus-corpuscles, and if these preponderate, the fluid assumes a yellow colour, and a pustule is formed.

The papillary body remains unchanged in external form, but is permeated by a large number of cells, which accumulate especially at the summits of the papillæ, these cells forming a continuous layer with the deepest stratum of the rete Malpighii. At the summits of the papillæ the distinction between connective tissue and epithelium ceases, and the limits of the papillæ and epidermis can only be recognised by dissection with the needle. The irritated papillary body is in a condition of prolific cell-growth; the younger cells tend towards the surface, where they are thrown off as pus-cells (Rindfleisch).

It is customary to enumerate three varieties of pustules, which are distinguished only by size:—

a. Achor: this is a slightly elevated pustule, of the size of a millet-seed, which is usually perforated by a hair.

b. Pustula psydracica: this is a pustule of greater size than achor; its margin is not circular, and is surrounded with a red areola; it contains a large quantity of pus, which dries up into crusts of a yellow, yellowish-brown, or greenish colour; it occurs chiefly on the extremities.

c. Pustula phlyzacica: this is a pustule of at least the size of a pea, semi-globular in form, and filled with pus mixed with blood, which dries up into brown or black crusts.

The preceding efflorescences have been termed by Hebra *primary*, as they are the original forms in which skin diseases present themselves, as distinguished from the *secondary*, to which belong —1, excoriations; 2, scales; 3, crusts; 4, ulcers; 5, fissures; 6, cicatrices; 7, pigmentary accumulations.

1. *Excoriations* are abrasions of the surface of the skin, which are caused by mechanical injuries, as, for instance, by the scratching of nails. In general, they are the products of scratching, which is more or less severe, according to the intensity of the itching: in the slighter degrees of itching, as also in infancy, only the superficial layer of the epidermis is destroyed by the nail, whilst in the more severe forms the papillary body is exposed: it is not seldom observed that the loss of substance extends even to the subcutaneous cellular tissue. As the result of repeated scratching, inflammation, accompanied with exudation and effusion of blood, is induced. The exudation, as well as the blood, becomes dried up into yellow, brown, or black crusts, and these latter assume different forms, according to the cause of the scratching: thus, in prurigo and scabies they are small and roundish, like papules; whilst excoriations resulting from the presence of pediculi are linear in form; irregular, about the size of a millet-seed, and of a brownish-red colour, in pruritus cutaneus, and from severe attacks of some insects.

2. *Squamæ*, scales: these are masses of dead epidermis detached from their bed. The more superficial the inflammatory process, the thinner are also the detached epidermic scales, constituting, in this case, merely an *exfoliation;* the deeper the inflammatory process, and the longer its duration, the more considerable is also the mass of scales. The separation of these masses takes place in the form of branny scales (prurigo), in larger lamellæ (rubeola, psoriasis), or in a membranous form (scarlatina).

The explanation of severe cases, where, in addition to shedding, *accumulation* of epidermic cells takes place, is as follows: the more prolific the cell-growth on the surface of the inflamed cutis, the less complete is the formation of the separate cells. The average development which the cells attain is similar to that of the connecting cells between the cylindrical elements of the Malpighian layer, and the deepest cells of the horny layer. Instead of the gradual hardening process, termed horny formation, a simple desiccation of the soft protoplasm takes place: in this desiccating process the cells become adherent to one another, and maintain a prolonged, but purely mechanical connection with the surface of the skin. The scales in psoriasis acquire their shining pearly appearance from the presence of air, which permeates the cell-mass during the drying process (Rindfleisch).

3. *Crustæ,* crusts: these are yellow or brown masses on the surface of the skin, which result from the drying up of purulent exudations or extravasated blood; thus, for instance, crusts are caused by the drying up of the contents of the vesicles in herpes, or by desiccation of the free exuded fluid, as in eczema. An intermediate form between scales and crusts occurs when the crusts, formed of profuse sebaceous secretion, become mingled with abundant epidermic cells (seborrhœa). Crustaceous efflorescences result also from the accumulation of fungi and masses of epidermis, as in favus.

4. *Ulcera,* ulcers: these are losses of substance of the cutis, extending to various depths, and showing no tendency to heal, which are partly replaced by cicatricial tissue. Ulcers may be the result of various morbid processes, on which their form, extent, and course depend.

5. *Rhagades,* fissures: these are linearly formed rents in the skin and mucous membranes, which result from cracking. In all cases they are produced by repeated muscular action on inflamed parts, as on the palmar surface of the fingers and plantar surfaces of the toes, the angles of the mouth, the dorsum of the tongue, and the flexor and extensor surfaces of the elbow and knee joints.

6. *Cicatrices,* scars: these are new structures, consisting of connective tissue, which replace the destroyed parts of the cutis. Their size, form, surface, and pigmentation vary according to the depth and extent of the preceding losses of substance. Cicatrices are always formed of connective tissue, and never contain epithelial structure, hairs, sebaceous or sweat-glands, unless the remains of such structures which have been involved.

7. *Pigmentary accumulations* are anomalous discolorations, which remain as the result of a preceding inflammatory process, or appear as trophical disturbances without inflammation.

II.—DIAGNOSIS.

In the diagnosis of cutaneous diseases we have to depend chiefly upon objective rather than subjective symptoms, as the statements of patients are frequently fallacious. The eye is our chief guide in such a diagnosis, whilst the senses of touch and smell are of secondary importance. Further, in many cases the microscope and chemical analysis are advantageously employed.

In the first instance, we arrive at our diagnosis from the general appearance of the patient: daylight is therefore to be preferred to any artificial light, as the latter changes the aspect or colour of eruptions; and this remark applies especially to those skin affections which appear in the form of stains. The mere inspection of a single part is in most cases insufficient for a diagnosis; the patient is therefore to be stripped, so that the entire surface may be examined in order to ascertain whether the skin has been properly attended to and kept clean. We have further to notice the general condition of the skin as regards its nutrition and pigmentation, which afford important diagnostic data in certain dyscrasic affections. We have then to observe whether the skin is covered with any of the enumerated efflorescences.

Stains and *papules* are of a red colour, varying in shade, from the inflammatory process and effusion of blood; or of a brownish tint, from such past morbid conditions, from pigmentary affections, and from the presence of vegetable parasites. These eruptions occur either on limited parts or on the entire surface of the body. Their colour and distribution afford in some cases sufficient grounds for a diagnosis; as, for instance, the occurrence of the pale red papules of lichen urticatus, limited to the face or hand and forearm, or the general distribution of a similar eruption, indicative of syphilitic papules. Wheals appear as elevations of a pale red colour, or paler than the surrounding skin. An important point in the differential diagnosis is the presence or absence of itching; in the former case we find the effects of scratching (excoriations). An erythema nodosum may thus be distinguished from an urticaria.

Vesicles are to be examined chiefly in regard to their grouping, contents, and surroundings. Thus, in herpes iris we find a circumscribed group of vesicles, the centre of which displays larger and older vesicles, whilst in herpes zoster there are extended and frequently confluent groups of vesicles, the distribution of which is associated with the innervation of certain regions of the skin.

Blebs are to be examined in regard to their distribution and contents: thus, blebs are circumscribed when caused by burns or vesicants, and their contents are serous; whilst those of erysipelas occur on particular parts of the body, from which the disease can be diagnosed; and lastly, those of pemphigus, which are distributed over a great part of the cutaneous surface, their immediate vicinity only being reddened. Blebs produced by contusion contain blood, and are easily recognised by their dark bluish-red colour.

Pustules afford characteristic indications of the disease by which they are produced, both from their localisation and from the condition of their immediate vicinity. The pustules of acne are diagnosed chiefly from their occurrence on the face, chest, and back, but also from their constant association with comedones; the latter symptom is absent in those of impetigo, the effects of scratching (excoriations) being observable in this disease. The pustules of variola and of syphilis are usually distributed over the surface of the skin, the vicinity of the former being pale red, whilst that of the latter is coppery in colour. Further, in variola the purulent contents fill the entire pustule, but in syphilis only the summit is purulent, whilst the base is tubercular.

Excoriations directly indicate the presence of itching, their depth affording a criterion of its intensity, and their form of its cause. The duration of the itching is indicated by the different effects produced. From all these data, as we have already seen, we may arrive at an accurate conclusion regarding the cause of the disease.

Scales are relatively of little diagnostic value; from their existence we can only ascertain whether we have to deal with the products of an inflammatory affection or with a disease *sui generis*, viz., psoriasis; in the latter case the scaly eruption is distributed over the entire surface, occurring especially on the exterior surfaces of the joints, whilst the presence of scales, limited to the palm of the hand and sole of the foot, usually indicates syphilis. Scaly eruptions are frequently associated with anomalies of pigmentation, as well as affections of the hair, and indicate in such cases the presence of vegetable parasites (herpes tonsurans, pityriasis versicolor, eczema marginatum).

Crusts. From the mere existence of crusts a diagnosis cannot be arrived at; we may, however, direct attention to the following points: *a, colour,* which is sulphur-yellow in favus; shining and deep yellow in that form of eczema which is known as *crusta lactea*; brownish-red or dark brown, as the result of the admixture of blood, in excoriations and ecthyma luridum; *b, distribution,* the crusts covering an extensive portion of the skin, as in eczema, or being more limited in their distribution (impetigo, syphilis); *c, form,* which is irregularly flattened in most of the inflammatory skin diseases, and pyramidal or conical in syphilitic ulceration (rupia syphilitica).

Ulcers present in many cases indications so characteristic that from their aspect we are enabled to form an accurate diagnosis of the disease by which they are produced. We enumerate strumous ulcers, characterized by their livid and undermined borders, and pale surface covered with exudation; chancroid ulcers, with sharp and excavated borders, and the surface covered with diphtheritic exudation; serpiginous syphilitic ulcers, with their characteristic kidney-like form, and bevelled or flattened edges, etc.

Cicatrices do not usually present any absolute and characteristic indications by which we may diagnose the preceding morbid process; in some cases, however, the appearance of the cicatrices may aid our diagnosis as to the nature of the disease. For instance, cicatrices which result from the severer degrees of burning and corrosion are thick, swollen, and distributed like rays; those resulting from chancroid ulcers are smooth and depressed, and either dark or not pigmented; those resulting from syphilitic ulcers are irregularly pigmented, kidney-shaped, shining, and at some parts depressed. The distribution of cicatrices also gives an approximate indication of their origin: thus those of acne and variola occur chiefly on the face; those resulting from pregnancy on the lower part of the abdomen; whilst the occurrence of flat and slightly pigmented cicatrices over the entire integument would suggest a preceding attack of syphilis. Herpes zoster leaves peculiar cicatrices, which occur in groups on one side of the body. The excoriations due to the presence of pediculi are indicated by linear, flat, and shining cicatrices on the back.

In regard to the *pigmentation* of the skin, we have to observe whether it is generally diffused or limited to small spaces, and which parts of the skin are most affected. We are thus enabled to infer the nature of the preceding morbid process.

The distinction of hæmorrhagic and pigmentary from inflammatory stains is especially effected by the sense of touch, as the former do not disappear on pressure with the finger, whilst the latter are more or less dispersed. Further, infiltrations of the skin (prurigo), changes of temperature, smoothness and roughness, and the removeable nature of scales, may thus be diagnosed. In many cases it is necessary to remove carefully scales or crusts with the finger, in order to examine the subjacent eruption. Thus, on removal of the scales of psoriasis we find a bleeding corium; on removal of the crusts of favus, a depressed and pale-red surface, covered with shining and delicate skin; on removal of the crusts of syphilis, a more or less deep loss of substance, covered with exudation; in eczema an excoriated and moist, and in seborrhœa a dry and pale red surface.

The microscope is an important aid in the diagnosis of skin diseases, and throughout this work we shall direct attention to the microscopic observations hitherto made in cutaneous pathology. It is here sufficient to remark, that in many skin affections we can only arrive at a diagnosis by this means; as, for instance, in *eczema marginatum*, a disease which has recently been the subject of so much controversy.

Chemical analysis, under certain conditions, affords information regarding the products of disease.

It is to be observed, that in many cases the phenomena of the disease are rendered obscure by various extraneous agencies, by previous treatment, and by the complication of several skin affections, all of which tend to increase the difficulty of the diagnosis. In such cases we can only avoid errors by experience, and the study of the course of the disease, since the most comprehensive description may be insufficient. In all doubtful cases it is necessary to await the development of the disease before making a diagnosis.

Lastly, in regard to the *subjective symptoms*, it is sufficient to remark that we may expect—more frequently than is generally believed—the most unreliable statements, which are often at variance with the objective phenomena. "Diatheses" and the statements of the patient are therefore relatively of little value.

III.—ETIOLOGY.

The skin, like other organs of the body, is subject to diseases which are *idiopathic* or *symptomatic*. The affections which are symptomatic are dependent upon general pathological conditions, the so-called blood diseases, or upon the diseases of particular organs. The connection subsisting between these morbid conditions is still involved in obscurity, and we must accept the results of clinical experience without the physiological explanation.

The skin affections which are caused by the morbid conditions of the blood, or the so-called dyscrasic diseases, are the following :—

All acute and chronic contagious skin diseases : measles, scarlatina, small-pox, syphilis, exanthematic typhus, etc.

There are also certain skin diseases dependent upon the scrofulous diathesis, as, for instance, lichen scrofulosorum and lupus; in the advanced stage of tuberculosis, pityriasis tabescentium and increased perspiration (hyperhydrosis) are observed; acne cachecticorum occurs in patients debilitated by disease.

Seborrhœa, acne, and effluvium capillitii are sometimes induced by general mal-nutrition, anæmia, and chlorosis. Certain forms of chronic and obstinate eczema are associated with malaria.

Amongst the diseases of particular organs which are associated with skin affections are to be mentioned : hypertrophy and valvular disease of the heart; in such cases cyanosis of the skin with œdema appears, and later cutaneous effusions of blood, the so-called petechiæ; diseases of the liver are accompanied by icterus, urticaria, and pruritus cutaneus.

The occurrence of urticaria and eczema frequently depends upon derangements of the stomach, especially digestive disorders. Hypertrophies of the spleen and liver are associated with general or local deposits of pigment. Diseases of the kidney, particularly morbus Brightii, are sometimes connected with pruritus cutaneus.

The functional disorders of the female generative organs are associated with several skin affections. As is well known, pigmentary deposits (chloasma) and pruritus occur during the normal course of pregnancy ; there is also an obvious connection between uterine and ovarian disease, and the occurrence of eczema, urticaria, and acne rosacea.

There is doubtless a relation between many skin affections and diseases of the internal organs, although in the present state of diagnosis we are unable to demonstrate the connection. The greater number of skin diseases, however, are idiopathic, being dependent upon external causes, as injuries, influence of temperature (heat and cold), action of noxious substances (irritants), too frequent and powerful action of water (douches). Certain skin affections, again, are produced either directly by the action of vegetable and animal parasites, or indirectly by the itching and consequent scratching with the nails.

There are several conditions which influence the form and frequency of skin diseases:—

a. Age. In infancy, seborrhœa, strophulus, intertrigo, and diphtheritis occur frequently; during the period of dentition children are liable to erythema and urticaria; vaccination also may produce an inflammatory condition of the skin, although this does not happen so frequently as is generally supposed. From the first year of life prurigo may occur; from the second, lichen scrofulosorum; from the third, lupus; and somewhat later, psoriasis. The periods of youth and maturity are less predisposed to skin diseases; whilst in old age, besides the physiological process of decay, there appear frequently new structures (molluscum, milium), pigmentary deposits, and pruritus cutaneus.

b. Sex. Several skin affections occur preferably in the female. Further reference to this point will be found in the special section.

c. Occupation is the source of different diseases. Thus we find callosities on quite characteristic parts in various manual labourers; eczema in those who work with corrosive liquids, or in the vicinity of fires (laundresses, bakers, stokers); lastly, the material itself in some cases has an injurious influence, as tar in process of fabrication.

d. Climate is not without influence on the frequency of skin diseases, as an instance of which we may refer to the frequent occurrence of sudamina during hot seasons and in warm climates. There are also certain skin affections peculiar to some countries; thus, lepra (elephantiasis Græcorum) is especially frequent in Norway and the Greek Archipelago, bouton d'Alep in Asia Minor, and Persia, etc.

e. Nutrition, has an influence upon the occurrence of skin disease, in so far as the use of certain kinds of food in many people causes urticaria. In recent times the connection between the occurrence of scorbutic hæmorrhages and the use of strongly salted food, as salt meat, etc., has been generally admitted.

f. The internal use of certain *drugs* not unfrequently induces skin affections; as instances, we mention the occurrence of a form of acne from the administration of iodine, and of urticaria from the use of copaiba balsam, cubebs, and turpentine.

Lastly, we have to notice the *hereditary* nature of certain skin diseases, which are transmitted from parents to children, sometimes, however, appearing only in the grandchildren. To this category belong psoriasis, ichthyosis, and anomalous pigmentation. We can also confirm the statements of Veiel in regard to the hereditary character of eczema.

It may be here mentioned that certain diatheses, especially struma and rachitis, have been regarded as the most frequent causes of the skin affections of children; and the cure by local treatment has been avoided, as it was assumed that by treating such eruptions locally a safety-valve to the system was closed, in consequence of which certain internal diseases would ensue. But if we compare, for instance, brain diseases in children with those of the skin, we find the proportion of the former much too small, since, according to this theory, brain diseases ought to have considerably increased, as skin affections are now locally treated; but this will not be confirmed by any physician who has had opportunities of observation.

IV.—COURSE.

We have already noticed in the chapter on diagnosis the distinctive features in the origin and course of various skin affections. In regard to the mode of occurrence, the distribution of the eruption is in many cases indicative of its origin, a law of production being assumed, although the details of its operation are still obscure. Thus, direct injuries affect in the first instance the injured parts. Certain affections again occur almost exclusively or preferably on the extensor surfaces of the joints and the outer surfaces of the extremities, as psoriasis, prurigo, and lichen urticatus; others on the flexor and inner surfaces, on which the skin is delicate, as eczema.

The distribution of the cutaneous blood-vessels influences considerably the occurrence of eruptions, and particular vascular areas regulate the circumscribed forms of most macular efflorescences; even erysipelas, which rapidly becomes diffuse, is evidently regulated in its occurrence and course by the vascular regions, and the appearance produced, as Billroth has justly observed, resembles that caused by artificial injection.

Many cutaneous inflammations correspond in their distribution with that of the lymphatic vessels; as, for instance, the red streaks in lymphangiotis and erysipelas. Those skin affections in which the groups of eruption are evidently dependent upon the distribution of particular nerves, are especially interesting. In herpes zoster, for instance, the groups are clearly connected with the distribution of the sensitive branches of the spinal nerves, whilst the phenomena of ichthyosis evidently indicate a trophical neurosis. The nervous areas (Spaltungsbezirke) of the skin, which have been accurately studied by C. Langer, would appear in many cases to influence the distribution and grouping of eruptions, although the regulating law has not hitherto been established.

The course of the disease presents in many cases characteristic peculiarities. First, we have to observe the depth to which the morbid process extends; thus, the papillary region only may be involved, or the disease may extend more or less deeply into the cutis, or even into the subcutaneous cellular tissue. The inflammatory process, when limited to the superficial layers of the cutis, is *erythematous;* in this case the destructive process is relatively inconsiderable, the reparation being therefore almost complete. In *phlegmonous* inflammation, on the other hand, which extends deeply into the tissues, causing considerable loss of substance as the result of suppuration, the reparative process never takes place completely, and only occurs in the form of cicatrices.

The efflorescence in its course is either limited to the part at which it orginated, without materially affecting the immediate vicinity, or the surrounding parts may become involved in the morbid process. Thus, for instance, an acne pustule runs its course, and dessicates with scarcely observable inflammation in its vicinity; whilst a pustule of ecthyma produces considerable inflammation of the surrounding parts, and may become the source of an ulcerative process.

There are certain skin affections distinguished by a peculiar mode of extension, the "serpiginous character," in which, whilst the part primarily attacked is cured, the disease extends from the periphery. We have already mentioned that syphilitic ulcers especially exhibit this serpiginous character. From this must be distinguished the confluence of several efflorescences, which are situated near one another; the older eruption remaining thereby unchanged in its character, whilst the form of efflorescence is always considerably modified by such confluence. It is also to be observed, that the mode of extension of certain diseases, especially those arising from vegetable parasites, is connected with the spread and growth of the *mycelium;* this is seen in pityriasis versicolor, herpes tonsurans, and eczema marginatum.

The morbid conditions—as pigmentation and cicatrices—left by certain skin affections are highly important as regards the etiology. Certain exanthemata may cause the loss of the organs of the senses. In treating of variola, we shall mention those unhappy cases which result in the destruction of one or both eyes. In elephantiasis Græcorum, even entire limbs may be lost, in consequence of the destruction of the soft parts. Lastly, we may notice those morbid conditions of the internal organs, which are sometimes associated with skin diseases, as the affections of the lungs and kidneys which occur in severe cases of prurigo, and the general marasmus resulting from lichen ruber, prurigo, and elephantiasis Græcorum.

V.—THERAPEUTICS.

THE enumeration of the whole catalogue of internal remedies, which have been used in the treatment of cutaneous diseases since ancient times, would be nearly tantamount to writing the entire *materia medica.* It is sufficient to state, that most of the medicinal agents formerly in vogue, for instance, barytes, sulphur, cantharides, viola tricolor, dulcamara, etc., are useless. It is evident that remedies which are useful in internal diseases exercise a curative influence on the skin affections thus produced; of such the following only are worthy of notice: arsenic, mercury, quinine, iron, cod-liver oil, iodide of potash, and carbolic acid.

We regard *external* treatment, however, as of the greatest importance.

Water used in baths, douches, bandages, etc., is an important remedial agent.

Sulphur is employed as *solutio Vlemingkx,* as a paste with glycerine and alcohol, or in ointments, and in natural sulphurous springs (Baden, Aachen, Mehadia, etc.).

Tar is used as *oleum fagi, oleum cadini,* and *oleum rusci;* the effects of which three forms are similar; the most concentrated, however, is the most efficacious. Tar is also combined with other agents, as alcohol, ether, glycerine, and sapo viridis. In treating of special diseases, we shall allude to the method of application of, and the conditions produced by, this remedy.

The products of the distillation of tar, as carbolic acid and resin, have lately been successfully employed, and are more agreeable to patients than tar.

Soaps also take a prominent place as remedial agents, especially potash soap (sapo viridis).

Caustics are chiefly used in chronic infiltrations of the skin, and in particular, nitrate of silver, either in the solid form, or in solutions of various strength. *Caustic potash* also, in the same form as nitrate of silver, of various strength; corrosive sublimate; sulphuric, nitric, chromic, and hydrochloric acids; *Vienna paste,* consisting of caustic potash and quick-lime, diluted with alcohol; *arsenical paste,* consisting of arsenic, cinnabar, and lard; *Landolf's paste,* consisting of the chlorides of bromine, zinc, and antimony; chloride of iron; *Plenk's paste,* consisting of corrosive sublimate, camphor, carbonate of lead, alum, spirits of wine, and vinegar, in equal proportions; chloride of zinc, alum, calomel, etc. Recently, vulcanised india-rubber cloth has been successfully employed as a dressing in several skin affections (Hardy, Hebra).

An important plan of treatment is the so-called "expectant method," which consists simply in allowing the morbid process to run its spontaneous course, and is especially to be recommended in acute diseases of the skin.

VI.—CLASSIFICATION.

The oldest classification dates from *Mercurialis,* who, like *Galen,* divided skin affections into those of the scalp and those of the rest of the integument. The former were described as follows: 1, de defluvio; 2, de alopecia et ophiasi; 3, de calvitie; 4, de canitie; 5, de morbo pediculari; 6, de porrigine; 7, de achoribus et favis; 8, de tinea; 9, de psydraciis, heleydriis, sycosi et exanthematibus; 10, leuce and alphos, and those in which the skin is rough; 11, pruritus; 12, scabies; 13, lepra; and 14, lichenes.

Lorry divides skin diseases into A, idiopathic, and B, symptomatic. The former affecting the entire integument, these being sub-divided according to their thickness and structure, or according to their causes, as poisons, stings of insects, etc. The latter (B) into those affecting the entire surface of the skin, these being sub-divided into such as are or are not accompanied by fever, and into those affecting only a part of the integument. Denti and Fuchs adopt this system.

Plenk classifies skin diseases according to the form of their pathological products: 1, maculæ; 2, pustulæ; 3, vesiculæ; 4, bullæ; 5, papulæ; 6, crustæ;

7, squamæ; 8, callositates; 9, excrescentiæ; 10, ulcera; 11, vulnera; 12, insecta; 13, morbi unguium; 14, morbi pilorum. This classification is adopted by Willan and Bateman, Biett, Cazenave and Schedel, and Gibert.

Willan's system comprises the following 9 orders and 41 varieties:—

I. *Papulæ*, to which belong 1, strophulus; 2, lichen; 3, prurigo.
II. *Squamæ:* 4, lepra; 5, psoriasis; 6, pityriasis; and 7, ichthyosis.
III. *Exanthemata:* 8, rubeola; 9, scarlatina; 10, urticaria; 11, roseola; 12, purpura; 13, erythema; and 14, erysipelas.
IV. *Bullæ:* 15, pemphigus; and 16, pompholyx.
V. *Pustulæ:* 17, impetigo; 18, porrigo; 19, ecthyma; 20, scabies; and 21, variola.
VI. *Vesiculæ:* 22, varicella; 23, vaccinia; 24, herpes; 25, rupia; 26, miliaria; 27, eczema; and 28, aphtha.
VII. *Tubercula:* 29, phyma; 30, molluscum; 31, vitiligo; 32, acne; 33, sycosis 34, lupus; 35, elephantiasis; and 36, frambœsia.
VIII. *Maculæ:* 37, ephelis; and 38, nævus.
IX. *Excrescentia:* 39, verruca; 40, clavus; and 41, callus.

Alibert attempted to arrange skin diseases according to their affinity, and he adopted a natural system of classification: he divided cutaneous diseases into the following 12 classes:—

A. *Dermatoses eczemateuses*, to which belong: erythema, erysipelas, pemphigus, and zoster.
B. ,, *exanthemateuses:* variola, vaccina, varicella, roseola, rubeola, scarlatina, and miliaria.
C. ,, *teigneuses:* achor, porrigo, favus, and trichoma.
D. ,, *dartreuses:* herpes, varus, militagra, and esthiomenos.
E. ,, *cancereuses:* carcinoma and celois.
F. ,, *lepreuses:* leuce, spiloplaxis, elephantiasis, and radesyge.
G. ,, *veroleuses:* syphilis and mycosis.
H. ,, *strumeuses:* scrofula and malleus.
I. ,, *scabieuses:* scabies and prurigo.
K. ,, *hemateuses:* peliosis and petechiæ.
L. ,, *dyschromateuses:* pannus and achroma.
M. ,, *heteromorphes:* ichthyosis, tylosis, verruca, onygosis, dermatolysis, and nævus.

It is obvious that in this system many new terms have been invented, which only tend to complicate the nomenclature.

Duchesne Duparc, formerly Alibert's assistant, adopts the natural system, and divides skin diseases into the following 11 classes:—

1. *Inflammatory affections:* as erythema, erysipelas, pemphigus, ecthyma, urticaria, herpes, etc.
2. *Exanthematic* ,, scarlatina, variola, etc.
3. *Crustaceous* ,, simple (achor) and parasitic (favus).
4. *Squamous* ,, psoriasis and ichthyosis.
5. *Anomalous* ,, cancerous and leprous (elephantiasis).
6. *Strumous* ,, lupus.
7. *Scabious* ,,
8. *Hæmorrhagic* ,,
9. *Pigmentary* ,,
10. *Hypertrophic* ,, capillary (nævus), follicular, tubercular, and incidental.
11. *Syphilitic* ,,

Peter Frank divided cutaneous diseases into two principal groups: acute (exanthematic) and chronic (impetiginoid); each of which he sub-divided into idiopathic and symptomatic. Schönlein adopted the same classification.

The system of *Erasmus Wilson* is essentially anatomical.

1. Affections of the corium.
2. ,, ,, sudoriparous glands.
3. ,, ,, sebiparous glands.
4. ,, ,, hair and hair-follicles.

To class 1 belong: A, inflammatory affections; B, papillary hypertrophies C, vascular anomalies; D, nervous disturbances; E, pigmentary anomalies.

A. *Inflammatory affections* are sub-divided into the following:—

a. Congestive; including *specific* diseases: rubeola, scarlatina, variola, varicella, vaccina; and *non-specific:* erysipelas, urticaria, roseola, and erythema.

b. Exudative: including *asthenic* affections: pemphigus, rupia; and *sthenic:* herpes, eczema, and sudamina.

c. Suppurative: impetigo and ecthyma.

d. Plastic: lichen, strophulus, and prurigo.

e. Squamous: lepra, psoriasis, and pityriasis.

f. Parasitic: scabies.

B. *Papillary hypertrophies:* verruca, tylosis, clavus, and pachulosis.

C. *Vascular anomalies:* teleangiectasia and purpura.

D. *Nervous disorders:* pruritus.

E. *Pigmentary anomalies: a,* increase; *b,* decrease; *c,* pigmentary change; *d,* chemical coloration by oxide of silver.

2. *Affections of the sudoriparous glands* are sub-divided into those in which the secretion is increased, decreased, or changed.

3. *Affections of the sebiparous glands* are sub-divided like the preceding, as also

4. *Affections of the hair and hair follicles.*

Chausit classifies skin diseases as follows: 1, inflammatory affections; 2, anomalies of secretion; 3, hypertrophies; 4, degenerations; 5, hæmorrhages; 6, nervous disorders; 7, parasites; and 8, affections of cutaneous appendages.

The system of *Bazin* is as follows:—

1. *Difformities;* nævi, vitiligo.
2. *Surgical diseases; a,* mechanical, as wounds; *b,* artificial, by parasites.
3. *Internal diseases;* exanthemata, etc.
4. Pseudo-exanthemata, phlegmasiæ, purpura, herpes, and diatheses.

Hardy, in his classification, regards more the nature of the disease than its external aspect, and divides cutaneous diseases into 10 groups.

1. *Stains* and *deformities,* which are either hereditary or acquired, as ephelis, vitiligo, lentigo, warts, molluscum, ichthyosis, and keloid.
2. *Local inflammations;* as erythema, urticaria, etc.
3. *Parasites;* scabies, favus, etc.
4. *Febrile eruptions;* variola and scarlatina.
5. *Symptomatic eruptions;* herpes, sudamina, etc.
6. *Squamous affections;* as eczema, psoriasis, and lichen.
7. *Strumous affections;* as lupus.
8. *Syphilitic affections.*
9. *Cancerous affections.*
10. *Exotic affections;* as elephantiasis.

Baerensprung formed his system on physiological data:

I. *Disturbance of innervation:* *a*, of sensibility (pruritus); *b*, of circulation; *c*, trophical.
II. ,, ,, *secretion:* seborrhœa, hyperidrosis, and anidrosis.
III. ,, ,, *nutrition.*
  a. *Cutaneous emphysema.*
  b. *Cutaneous œdema.*
  c. *Hyperæmia* and *anæmia.*
  d. *Hæmorrhages.*
  e. *Inflammatory affections:* 1, diffuse: erythematous, phlegmonous, eczematous; 2, exanthematic; 3, furunculoid.
  f. *Helkose:* 1, idiopathic; 2, virulent; 3, dyscrasic.
  g. *Gangrene.*
  h. *Pigmentary formation.*
  i. *Hypertrophy:* 1, epidermic; 2, papillary; 3, vascular; 4, hypertrophy of corium; 5, hypertrophy of hair-follicle and cutaneous glands.
  k. *Carcinoma.*
  l. *Affections of the hair.*
  m. ,, ,, *nail.*

Dr. Buchanan (Edinb. Med. Journ. 1865), natural system:—

Class 1.—*Inflammatory affections:* erythematous, eczematous, and phlegmonous.

Class 2.—*New formations:* A, homologous: *a*, epidermal; *b*, pigmentary; *c*, dermal. B, heterologous: pseudoplasmata and neoplasmata.

Class 3.—*Hæmorrhages.*

Class 4.—*Diseases of the accessory organs.*

Class 5.—*Diseases originating in the same causes:* *a*, parasites; *b*, typhus and febrile exanthemata.

Buchanan prefers the subdivision into erythematous and eczematous to the ordinary classification of vesicles, papules, etc., because the skin is variously affected according to the irritation.

Erythematous inflammations:—

1. *Erythema simplex,* papulos, squamos, nodos, strophul.
2. *Herpes idiopathica,* ab ingestis, uterina, dentina.
3. *Dermatitis idiopathica* (erysipelas), symptomat.
4. *Pemphigus.*

Eczematous inflammations:—

1. *Eczema; stage I, dry:* erythematodes, papulatum, lichen simplex, and prurigo; *stage II, eczema moist* (vesicular, rubrum, pustulos.); *stage III, dry,* lichen exudat, ruber eczema squamosum.
2. *Acne.*
3. *Ecthyma.*
4. *Psoriasis.*

Hebra's anatomico-pathological system enumerates 12 classes:—

Class I. *Hyperæmiæ cutaneæ.*
  A. *Active hyperæmiæ.*
    a. *Idiopathic active hyperæmiæ.*
      1. Erythema traumaticum.
      2. ,, caloricum.
      3. ,, ab acribus, seu venenatum.

Class I.—*Continued.*

b. Symptomatic hyperæmiæ.

1. Erythema infantile, s. roseola infantilis.
2. „ variolosum, s. roseola variolosa.
3. „ vaccina.

B. *Passive hyperæmiæ.*

a. Idiopathic passive hyperæmiæ.

1. Livedo mechanica.
2. „ calorica.

b. Passive symptomatic hyperæmiæ: cyanosis, morbus cœruleus, cyanopathia, atelectasia, anæmatosis, and *maladie bleu.*

Class II.—*Anæmiæ cutaneæ.*

A. Anæmia of the skin from absolute deficiency of blood.

a. Anæmia of the skin as the result of hæmorrhage.
b. „ „ „ disease.

B. Anæmia of the skin from anomalous innervation.

Class III.—*Anomalies of the cutaneous glands.*

1. *Morbid change of the sebiparous glands and their secretion.*

A. *Excessive secretion of sebum:* stearrhœa, fluxus sebaceus, seborrhœa, acne sebacea, sebaceous flux, and gneis.

a. Seborrhœa capillitii.
b. „ faciei.
c. „ genitalium.

B. *Diminished secretion of sebum.*

C. *Deficient or impeded excretion of sebum.*

a. Comedo.
b. Milium s. grutum, stophulus albidus, s. candidus.
c. Molluscum contagiosum.

2. *Morbid states of sudoriparous secretion.*

A. *Quantitative anomalies of secretion.*

a. Hyperidrosis.
b. Anidrosis.

B. *Qualitative changes of secretion.*

Class IV.—*Cutaneous exudations.*

A. *Exudative dermatoses with acute course.*

a. Acute, exudative, and *contagious dermatoses:* rubeola, scarlatina, variola, *petite verole,* and vaccina.
b. Acute, exudative, and non-contagious dermatoses.

Gr. 1. *Polymorphous erythemata,*

Erythema exudativum multiforme.
„ nodosum.
Pellagra.
Acrodynia.
Roseola.
Urticaria.

Class IV.—*Continued.*

- Gr. 2. *Dermatitides proper.*
  - *Dermatitides idiopathicæ.*
    - Dermatitides traumatica.
    - ,, venenata.
    - ,, calorica.
      - ,, ,, ambustionis.
      - ,, ,, congelationis.
  - *Dermatitides symptomaticæ.*
    - *a.* Dermatitides erythematosa, erysipelas.
    - *b.* ,, phlegmonosa: anthrax, furunculus, plyma, maliasmus, necrogenic pustule, and pustula maligna.
- Gr. 3. *Phlyctænoses. Herpes:*
  - *a.* Herpes labialis.
  - *b.* ,, præputialis.
  - *c.* ,, zoster (zona).
  - *d.* ,, iris and circinatus.
  - Miliaria.
  - Pemphigus acutus s. febrilis.

B. *Exudative dermatoses with chronic course.*

- Gr. 1. *Squamous dermatoses:* psoriasis, s. lepra Willani, lichen (exudativus).
  - *a.* Lichen scrofulosorum.
  - *b.* ,, (exudativus) ruber.
  - Pityriasis rubra.
- Gr. 2. *Pruriginous dermatoses.*
  - *Eczema.*
  - *Acute eczema:*
    - *a.* Eczema acutum faciei.
    - *b.* ,, ,, genitalium.
    - *c.* ,, ,, manuum et pedum.
    - *d.* ,, ,, universale.
  - *Chronic eczema:*
    - *a.* Eczema chronicum capillitii.
    - *b.* ,, ,, faciei.
    - *c.* ,, ,, trunci.
    - *d.* ,, ,, genitalium.
    - *e.* ,, marginatum.
    - *f.* ,, articulorum extremitatum.
    - *g.* ,, manuum, pedum et digitorum.
    - *h.* ,, extremitatum.
  - Eczema mercuriale s. hydrargyria.
  - Scabies.
  - Prurigo.
- Gr. 3. *Papular eruptions.*
  - Acne disseminata.
  - Sycosis, acne, mentagra.
  - Acne rosacea, gutta rosea.

Class IV.—*Continued.*

- Gr. 4. *Pustular eruptions, dermatoses pustulosæ:* impetigo and ecthyma.
- Gr. 5. *Bullous eruptions, pemphigus chronicus:*
  - a. Pemphigus vulgaris.
  - b. ,, foliaceus (Cazenave) rupia.

Class V.—*Hæmorrhagic diseases, hæmorrhagiæ cutanæ.*

1. *Idiopathic hæmorrhages:*
   - a. Extravasation from contusion.
   - b. ,, ,, wounds.
   - c. ,, ,, mechanical disturbances of circulation.
2. *Symptomatic hæmorrhages:*
   - a. Purpura rheumatica (peliosis rheumatica).
   - b. ,, simplex.
   - c. ,, papulosa (Hebra).
   - d. ,, hæmorrhagica (morb. maculosus Worlhoffii).
   - Variola nigra s. hæmorrhagica.

Class VI.—*Hypertrophies.*

- A. *Hypertrophy of epidermis.*
  1. Lichen pilaris.
  2. Tyloma (super-imposed layers of epidermis).
  3. Clavus.
  4. Pityriasis simplex.
  5. Ichthyosis.
  6. Verruca.
  7. Verrucosus.
- B. *Hypertrophy of pigment.*
  1. Lentigo.
  2. Chloasma.
  3. Melasma.
  4. Nævus spilus.
  5. Pityriasis nigra.
- C. *Hypertrophy of corium.*
  - Elephantiasis, pachidermia.
- D. *Hypertrophy of follicle.*
  1. Sebaceous follicle.
  2. Hair-follicle.
- E. *Hypertrophy of cutaneous appendages.*
  - a. Of the hair:
    1. Polytrichia.
    2. Trichauxe.
    3. Dermatoceras.
  - b. Of the nail:
    1. Polynychia.
    2. Onychauxe.

Class VII.—*Atrophy:*

- A. *Atrophy of epidermis.*
- B. ,, ,, *pigment.*
  - *Leucopathia:*
    1. Leucopathia congenita.
    2. ,, acquisita.

Class VII.—*Continued.*

C. *Atrophy of cutis.*
D. „ „ *follicle.*
  1. Atrophy of sebaceous follicle.
  2. „ hair-follicle.
E. *Atrophy of cutaneous appendages.*
  a. Of the hair. A. Of the pigment of the hair.
    1. Peliosis, senilis, præmatura, circumscripta. B. Of the hair itself.
    2. Alopecia, senilis, præmatura, circumscripta, venerea.
  b. Of the nail.
  Onychatrophia.

Class VIII.—*New formations, neoplasmata.*

A. *Epidermic growth.*
B. *Cell-growth.*
  1. Molluscum simplex et pendulum:
    The later stages of
  2. Acne rosacea.
  3. Condylomatous excrescences.
C. *Fibroid tissue, formation of callus.*
  1. Cicatrices.
  2. Keloid
  3. Callus.
D. *Fatty growth, lipomata.*
E. *Vascular growth, teleangiectasie.*
  Nævus vascularis; A, simplex; B, flammeus; C, fungosus.
F. *Cholesteatom.*
G. *Anomalous osseous substance* in the skin.
H. *Melanosis.*

Class IX.—*Pseudoplasmata.*

1. *Cancer:*
  a. Fibrous cancer, scirrhus.
  b. Medullary cancer, canc. medullaris.
    A. Canc. melanodes (sarcoma melanod).
    B. Sweep's cancer.
    C. Canc. hæmatodes.
    D. Carcinome ébernée (Alibert).
2. *Tubercle.*

Class X.—*Ulcerative process in the skin.*

Ulcera cutanea idiopathica.
„ „ symptomatica.

Class XI. *Parasites.*

A. *Vegetable:*
  1. Favus. a. Herpes tonsurans.
    b. Pityriasis versicolor.
  2. Alopecia areata. (?)

Class XI.—*Continued.*
- B. *Animal:*
  - 1. Pediculi.
    - *a.* Ped. humani capitis.
    - *b.* ,, ,, corporis.
    - *c.* ,, pubis.
  - 2. Acarus folliculorum.
  - 3. Sarcopetes hominis.
  - 4. Leptus autumnalis.
  - 5. Pulex penetrans.

Class XII.—*Neuroses of the skin.*
- A. *Hyperæsthesia cutis.*
  - 1. Dermatalgia.
  - 2. Pruritus cutaneus, prurigo sine papulis, prurigo latens.
  - 3. Dermato typosis, intermittens cutanea.
- B. *Anæsthesia cutis:*
  - 1. Anæsthesia partialis.
  - 2. ,, universalis.
- C. *Dermatospasmus.*
  - Cutis anserina.

Whilst acknowledging the difficulty of framing a classification which will give general satisfaction—as the phenomena of nature do not admit of an absolute systematic arrangement—we have yet proposed the following new system, which is based upon the histological investigations of recent times, and which has at least the merit of being a distinct arrangement. It is evident that we cannot frame a classification on purely histological data, as we have also to take into account the etiology, clinical phenomena, and course of the disease. In our system, certain groups are included which have been used by earlier dermatologists, although unaided by the recently established anatomical and pathological data and modes of investigation. Thus, prurigo, lichen, and psoriasis are still included in the inflammatory group, although, upon histological grounds, these diseases would be more accurately placed in the class of hypertrophies or new formations. Indeed, our system may be regarded as a simplification of that of Hebra, with the collection of several groups into one, and the omission of certain classes.

Class I.—*Anomalies of secretion.*
- A. *Of sebaceous glands.*
  - *a. Increased secretion,* seborrhœa.
  - *b. Accumulated secretion:* comedo, milium, vitiligoidea, molluscum contagiosum, follicular tumor, concretions.
  - *c. Diminished secretion,* xeroderma.

Class I.—*Continued.*

B. *Of sudoriparous glands.*

- *a.* Hyperidrosis.
- *b.* Anidrosis.
- *c.* Bromidrosis.
- *d.* Chromidrosis.

Class II.—*Inflammatory affections.*

A. *Contagious.*

- *a.* *Acute typical course:* 1, variola; 2, scarlatina; 3, rubeola.
- *b.* *Infection by animal poisons:* pustula maligna, necrogenic pustule, snake bite, glanders.
- *c.* *Diphtheritic.*

B. *Non-contagious.*

- *a.* *Erythematous:* erythema papulatum, gyratum, annulare, iris, nodosum, urticans, roseola vaccina, urticaria, lichen urticatus, pellagra, erysipelas.
- *b.* *Phlegmonous:* furunculus, anthrax, pseudo-erysipelas.
- *c.* *Vesicular:* herpes (labialis, præputialis, zoster, iris, circinatus); sudamina, eczema.
- *d.* *Bullous:* pemphigus.
- *e.* *Pustular:* acne, acne rosacea, sycosis.
- *f.* *Squamous:* psoriasis, pityriasis rubra.
- *g.* *Papular:* prurigo, lichen scrofulosorum, lichen ruber.

C. *Traumatic.*

- *a.* *By mechanical causes:* erythema traumaticum, excoriations.
- *b.* *By chemical causes:* corrosion, vesicants.
- *c.* *By caloric causes:* burns, frost-bite.

Class III.—*Hæmorrhagic affections:* purpura simplex, rheumatica, papulosa, scorbutica, morb. maculos. Werlhoffii, ecchymomata.

Class IV.—*Hypertrophic affections.*

- A. *Of epidermic elements:*
  - Lichen pilaris, tyloma, clavus, ichthyosis, verruca, hypertrophy of hair (polytrichia, trichauxe), hypertrophy of nail (onychogryphosis), cornu cutaneum.
- B. *Of connective tissue elements:*
  - 1. *Circumscribed*: condyloma, frambœsia.
  - 2. *Diffuse*: elephantiasis Arabum, sclerema.

Class V.—*Atrophic affections.*

- Alopecia areata, atrophy of cutis, scars of pregnancy, atrophy from past skin diseases, cicatrices, atrophy of hair (alopecia).

Class VI.—*New formations.*

- A. *Diffuse*: lupus, syphilis, elephantiasis Græcorum.
- B. *Tumors*: fibroma molluscum, papillary tumors, keloid, angioma, lipoma, adenoma, sarcoma, carcinoma.

Class VII.—*Pigmentary anomalies.*

- A. *Deficiency*: albinismus, vitiligo (leucopathia acquisita).
- B. *Increase*: nævus, ephelis, lentigo, chloasma, melasma, morb. Addisoni, argyria, etc.

Class VIII.—*Neuroses*:

- Disturbances of sensibility and motor power, angioneuroses.

Class IX.—*Parasites.*

- A. *Animal.*
  - 1. *Those living in the skin*:
    - Acarus scabiei, acarus folliculorom, filaria medinensis, pulex penetrans, ixodes ricinus.
  - 2. *Those living temporarily on the skin*:
    - Cimex lectularius, culex pipiens, leptus autumnalis, phtirius inguinalis, pediculus capitis, pediculus vestimenti.
- B. *Vegetable.*
  - Favus, herpes tonsurans, pityriasis versicolor, eczema marginatum, onychomycosis, sycosis parasitaria.

PART II.—SPECIAL.

CLASS I.

ANOMALIES OF SECRETION.

Anatomy and physiology of cutaneous glands, see pages 20-24.

The secretion of the sebaceous glands imparts to the skin a certain softness and flexibility. This secretion may undergo a morbid change, being either increased or diminished in quantity, or altered in quality.

A. Increase of sebaceous secretion, sebaceous flux, Seborrhœa.

(*Synonyms: Stearrhœa, Acne sebacea, Fluxus sebaceus, Varus sebaceus, Seborrhagia, Steatorrhœa; also Pityriasis, Porrigo, Tinea furfuracea, amantacea seu asbestina, Pityriasis tabescentium, scrofulosorum, Ichthyosis sebacea, etc.*)

Seborrhœa consists in augmented secretion of sebum mingled with epidermic cells, appearing on the surface of the skin, in the forms now to be described.

The morbid secretion of sebum is either local or general. Seborrhœa occurs locally, especially on the scalp, the nose, the area of the beard, and the genital organs. The changes in the skin vary according to the excess either of the solid sebaceous constituents, as stearine and margarine, or of the fluid, as oleine. In the former case the fatty masses present a scaly aspect (*Acne sebacée sèche*), the condition being termed *seborrhœa amianthacea*. This disease presents itself in the form of scales and crusts, and occurs chiefly on the scalp during the first year of life, but also in adults, both in mature and old age, particularly in women, who suffer from disorders of menstruation: syphilis also is a frequent cause of this affection. On the removal of the sabaceous crusts from their bed, we observe on their under surface minute plug-shaped processes, which represent the accumulated sebaceous masses of the excretory ducts.

1. *Seborrhœa Capillitii.* As is well known, the secretion of the sebaceous glands is augmented on the entire integument of the fœtus during intra-uterine life; and this excessive secretion on the scalp lasts during the first year of extra-uterine life. The accumulation of sebum on the surface of the integument when mingled with extraneous dirt and dust during the continuance of the excessive secretion, forms crustaceous masses, attaining to the thickness of several lines, and even of half an inch, and the entire scalp is covered with a thick sebaceous coating. After the first year of life, the growth of permanent hair commences, which process gradually loosens and throws off the crusts, if they have not previóusly been removed by other means. Seborrhœa is usually complicated with eczema, if the crusts remain accumulated for a long period, as the aggregated and decayed masses irritate and macerate the skin, inducing redness and moisture. There are also, however, thick scales, by which the hair becomes matted, or tube-like lamellæ, which glue the hairs in groups (*Pityriasis amianthacea*).

In the seborrhœa capillitii of adults, thinner crusts are generally formed, yellowish crusts, or dry, scaly masses being thus accumulated; the former occur most frequently about the period of puberty, in anæmic and tubercular subjects, or associated with disorders of menstruation, the latter often in healthy individuals. These scaly masses are most frequently observed between the twentieth and twenty-sixth year, and are sometimes associated with *effluvium capillitii.* In old age, a form of seborrhœa occurs, which is dependent upon certain changes in the sebaceous glands, later to be described; the scalp, which is almost entirely denuded of hair, is covered with a dirty greyish-brown and easily removable coating.

In syphilis, the loss of hair is associated with seborrhœa, which appears in the form of closely adherent, thin sebaceous masses, of a dirty-yellowish colour.

2. *Seborrhœa faciei.* Seborrhœa oleosa is most frequently observed on the skin of the face, *i.e.* the oily constituent of the sebaceous secretion preponderates. The skin of the forehead in patients thus affected has a shining aspect, if cleanliness is observed; but if this is neglected, dirt and dust become mingled with the secretion, whereby dark greasy-looking patches are produced.

3. *Seborrhœa nasi.* Sebaceous flux on the nose is frequently associated with enlarged cutaneous veins. The nose, like the forehead, has a fatty lustre, and the excretory ducts of the sebaceous glands are widened; these veins give a reddish aspect to the nose, which is more marked during cold weather. On touching such parts with a piece of blotting paper or linen, it becomes saturated with fat, usually discoloured with dust.

4. *Seborrhœa genitalium.* Seborrhœa occurs very frequently on the genitals. The sebaceous masses accumulate in greater quantity in individuals with a narrow phimotic prepuce; and being favoured by the moisture and high temperature, as well as by the contact of two cutaneous surfaces (prepuce and glans), these sebaceous masses become decayed, and frequently induce inflammation of the glans (balanopsthitis). Seborrhœa occurs also frequently on the inner surface of the labia majora.

5. *Seborrhœa universalis* very rarely occurs in adults.* This disease appears in the form of dry, horny masses, which are distributed over extensive parts of the skin. These masses occur as lamellæ, corresponding to the furrows of the skin (Ichthyosis sebacea), or, in emaciated subjects, as thin, shining scales, covering the entire cutaneous surface (Pityriasis tabescentium). In children, the accumulation of sebum is a physiological process during intra-uterine life. These masses *(vernix caseosa)*, when not removed after birth, dry up in lamellæ of the thickness of straw-paper, which gradually become loosened and thrown off after the lapse of a few days. On some parts, especially in children who are not kept clean, slight excoriations are formed on the naturally tender skin, so that these may lead to errors of diagnosis.

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* Biett describes such a case; and a second occurred in Bazin's clinique (Leitz), in a patient twenty-five years of age, who died of Bright's disease. Over the entire integument the excretory ducts of the sebaceous glands were closed with large masses of solid sebum, which latter formed swellings, from the size of a millet-seed to that of a hazel-nut, or even larger. The patient smelt of rancid butter; his urine contained albumen, and the analysis of the sebaceous masses was as follows:—

Water	357
Albumen	2
Lime	87
Casein	129
Fat	405
Phosphate of soda	7
Sulphate of soda	5
Chloride of sodium	5
Butyric acid	3

Differential Diagnosis. Seborrhœa may be confounded with other diseases, as *eczema, lupus erythematodes,* and *pemphigus foliaceus.* It is distinguished from eczema impetiginosum by the appearance of the skin after the removal of the crusts, the surface being red and moist in the latter affection, pale or slightly reddened in seborrhœa. Eczema usually extends from the hairy scalp to the forehead, neck, and ears, whilst seborrhœa is limited to the scalp. In eczema the adjacent lymphatic glands are swollen, but not in seborrhœa; in the former there is intense itching, rarely in the latter disease. Seborrhoea may be distinguished from lupus erythematodes by attending to the following points:—the sebaceous masses in the latter affection are closely adherent to the excretory ducts of the follicles, and are usually green and thin; on their removal, the skin is found swollen, reddened, and infiltrated, the excretory ducts of the follicles being either distended or completely disorganized. Diagnostic errors with pemphigus foliaceus are scarcely possible, as this affection extends over large surfaces, the exfoliated epidermis appearing in the form of large lamellæ, and these parts presenting regular excoriations; whilst seborrhœa is usually limited to small spaces; and if, in exceptional cases, it affects a considerable extent of surface, the crusts are closely adherent. In pemphigus *blebs* occur, never in seborrhœa.

Prognosis. The prognosis is usually favorable, seborrhœa being if not always completely curable, at least susceptible of material alleviation. It is curable, however, in children, and in those cases in which it is dependent upon disorders of menstruation, or a morbid condition of the blood, if these causes are removable.

Treatment. The first indication is the removal of the crusts, which is effected by impregnating them with a large quantity of oily matter. The method adopted is as follows:—the crusts are first moistened with a sponge saturated with oil; they are then covered with a flannel cap (which also may be oiled, especially when the crusts are very dry), and this again with an oiled silk cap. A period of twelve hours is sufficient to macerate crusts, even if they have been adherent to the skin for a long time, so that they may be easily removed by means of soap and water. Thin crustaceous pellicles require for their removal only simple inunction with oil. If the skin be found pale after the removal of the crusts, daily washing with soap, and the application of oily substances (as unguent. simplex, or spermatis ceti cum oleo olivarum. q. s. ut f. ung. molle) are sufficient. After persevering in this treatment for several days, it is discontinued, in order to see whether new crusts will be formed; and if this takes place the treatment is resumed, and continued for some time. When the complaint does not yield to this treatment, as happens sometimes in adults, washing with potash soap must be resorted to, for which are especially adapted potash cream, or *spiritus saponis alkalinus* (Hebra), *i. e.*, soft soap dissolved in alcohol according to the following formula:—

℞. Saponis viridis ℥ij
Spir. vini rect. ℥j
Filtra et adde
Spir. lavandul. ʒij

As regards the method of washing, the douche is most suitable, as the sebaceous glands, which have become widened by this affection, are gradually contracted by the influence of cold. As in seborrhœa of long duration, there exists also a slight infiltration of the skin; several ointments, as zinci oxidum, plumb. carbonas., præcipitat. alb. (of each a drachm to the ounce of lard) are successfully employed. The following formula also is used with good results:—

℞. Zinci oxidi.
Plumb. carbon. a.a. ʒj
Spermatis ceti, ℥j
Ol. oliv. q. s. ut. f. ung. molle.

It is chiefly in the seborrhœa of the genitals that powdered substances are employed with advantage; as, for instance, amylum, semina lycopodii, talcum venetum, pulvis lapidis baptistæ, pulvis aluminis plumosi, and pulvis oxidi zinci.

B. ACCUMULATION OF SEBUM.

The accumulation of sebum may take place either in the excretory duct (comedones) or in the sebaceous gland itself. If the accumulated secretion present the form of a papule, the affection is termed milium; if the secretion be fluid, producing swelling and distension of the sebaceous gland, the so-called glandular tumor (atheroma and molluscum contagiosum).

1. COMEDONES.

By comedones we understand plugs of sebum which fill up and distend the excretory ducts of sebaceous glands.

The anatomical process in the production of comedones is the following:—The accumulated epidermic and sebaceous masses distend the canal of the hair-follicle and sebaceous gland, either throughout its entire length, or at its deeper and closed extremity, or close to its opening at the surface of the skin, whilst the deeper part of the canal retains its normal width. As the thickness of the cutis and the length of the hair follicle vary on different parts of the body, they modify the mode of distension. If the skin is thick and the hair-follicle long, the sebum will readily accumulate in the deeper extremity, whilst the external opening remains either normal or is morbidly contracted, thus forming the neck of the follicle. (Virchow.)

The plug of sebum is black on its upper extremity, and when squeezed out, has a wormlike appearance. In comedones there is always distension of the sebaceous glands, and sometimes also of the hair-follicles. The extruded masses consist either of roundish cells, which contain granular fat, or entirely of sebum; between the cells there are also a number of fatty molecules, in which cholesterine crystals rarely occur; there are also found in the interior a quantity of hairs, and more frequently the *acarus folliculorum.*

The localities on which comedones occur are the face, chest, and back, and only when they are produced by external causes do they appear on other parts, as is observed in people who work in the fabrication of tar. The etiology of comedones is described under Acne, from which it is clinically inseparable.

Treatment. The treatment of comedones is purely local; it has been shown, however, by experience that sometimes their formation (when chronic) is associated with certain constitutional diatheses, as struma, tuberculosis, and other pathological states which affect the nutrition of the skin: they also frequently occur as the result of disorders of menstruation. In such cases the treatment must be directed towards the removal of the cause, as well as the local condition; comedones, however, are much more frequently only a local affection. The treatment consists chiefly in squeezing out the plugs of sebum by means of pincers, etc., after which the skin is to be rubbed with potash soap, or with spiritus saponis alkalinus; and when this does not accomplish the cure, we may resort to the inunction of sulphur-paste of the following formula (Zeissl):—

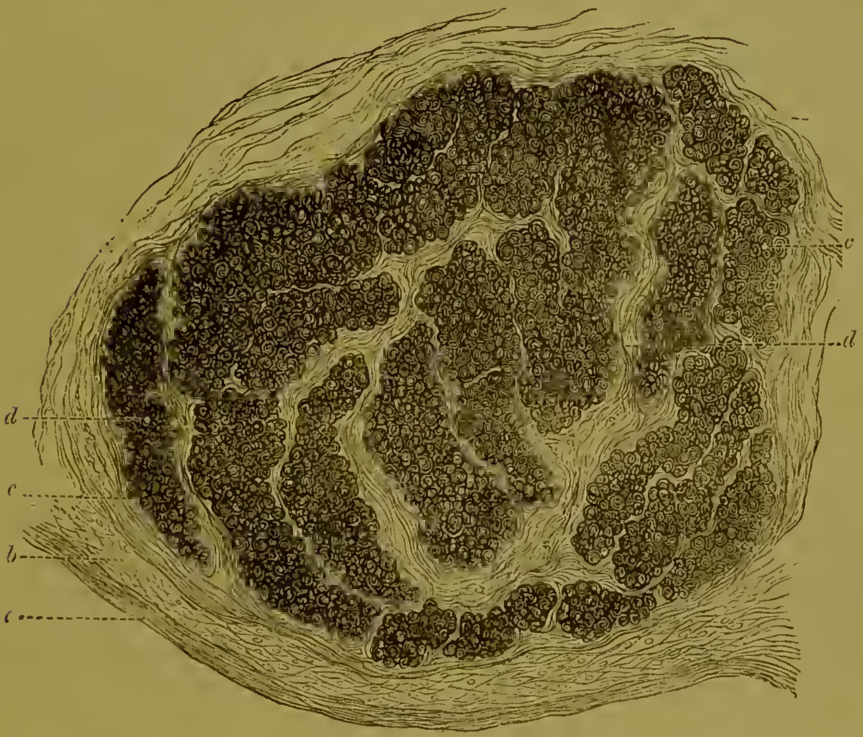
Lact sulfuris
Glycerini
Spir. vini rectif.
Potass. carbon.
Aether. sulph.
a.a. part. æquales.

Another mode of treatment is with sulphur soap, which is rubbed in at night and only washed off next morning. It is advisable to apply all these remedial agents at night, because the skin becomes irritated and reddened by them; and after every third day the employment of each remedy should be temporarily discontinued, in order to avoid excessive irritation of the skin.*

2. MILIUM (*Grutum*). Strophulus, Vitiligoidea.

Milium is produced by an accumulation of sebum in the sebaceous glands, the excretory ducts of which are disorganized; the gland loses its acinous structure, round, white papules being thus formed, which are covered only by a thin layer of epidermis. These bodies occur chiefly on the face (preferably on the eyelids and cheeks), on the genital organs, and frequently in the periphery of cicatrices, such as those of lupus. They are formed in the following manner: When in the case of thin cutis, which is only studded with lanugo and fine hair-follicles, masses of dry epidermis and sebum rapidly accumulate in the hair-follicle, the

Fig. 8.



Section of a lobular milium from the upper eyelid. *a.* Epidermis. *b.* Rete Malpighii. *c.* Wall of follicle. *d.* Sebaceous masses.

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* Martin (Brit, Med. Journal, 1868) recommends Hydrarg. corros. subl. gr. 8, Glycer ℥j, Aqu. rosac. ℥iv.

excretory duct of the latter is obstructed, and the follicle itself (being short) thus becomes distended in the form of a globular body, which shines through the hard epidermis.

The contents of the milium are epidermic cells and cholesterine crystals, and by the addition of sulphuric acid, acicular crystals of sulphate of lime are formed. It is exteriorly limited by the epidermis (*a*) and the Malpighian layer (*b*). The separate lobule is either formed by the wall of the hair-follicle (*c*) or of the sebiparous gland, which sends numerous connective-tissue septa into the interior of the lobular growth.

The skin affection described by Willan as *strophulus albidus* is evidently *milium*. If we retain the term, it should be applied to those accumulations of sebum which occur as papules, surrounded with a pale-red areola, in the skin of children, especially on the sole of the foot.

The *treatment* consists in making an incision into the epidermis, and squeezing out the globular bodies by means of pincers.

Colloid-milium.—Under this term a case has been discribed by Wagner, in which the skin on the forehead was thickened, and traversed by longitudinal and transverse folds, which were of a whitish colour at the deeper part, whilst the remaining portion of the cutis had a shining aspect, and was studded with numerous and thickly aggregated eminences of about the size of a millet seed. On making an incision, a pale-yellow colloid mass could be pressed out; the cheeks were less affected than the nose; the apertures of the sudoriparous and sebiparous glands could not be distinguished. This growth differs from the ordinary form of milium in the colloid nature of its contents; the epithelium in the former having undergone a *fatty*, in the latter a *colloid* degeneration. The common form of milium is produced by occlusion of the excretory duct whilst in the other case, this occurs only as a secondary result of the colloid change in the epithelium.

Vitiligoidea. Passing by the somewhat confused descriptions of earlier writers, we may apply this term, with Hebra (Atlas der Hautkrankheiten, 7 Heft, 1869), to a skin affection, occurring in the form of thickly aggregated groups of milium on the eyelids, and producing yellowish-coloured circumscribed patches, covered with a thin layer of epidermis.*

3. ATHEROMA (*Tumor of sebaceous follicle*).

The occlusion of the excretory duct leads to the accumulation of sebum and consequent distension of the sebaceous follicle, thereby producing the above-described comedones and milium, also the tumor termed *atheroma*. This growth consists of a sack with friable contents, enclosed by a thickened capsule; the inner layer of the capsule is usually thin, as the corium does not take part in its formation. In the soft contents are fatty molecules and crystals (especially cholesterine) and epidermis; the larger tumors contain greyish-white and greasy matter; the smaller, concentric layers of epithelial cells and cholesterine crystals. After some duration, blood corpuscles and pigmentary matter are also found, and if the follicle becomes inflamed, a greasy offensive and semi-purulent fluid is formed, which is discharged when the tumor breaks.

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* This affection has been observed only in eighteen cases.

These tumors occur singly, or variously distributed in the subcutaneous cellular tissue of the scalp, neck, forehead, face, eyebrows, eyelids, and more rarely on the trunk. They are observed in children as well as adults, either singly or numerously, varying in size from that of a pea to that of a hazel-nut or even a man's fist, and cause no inconvenience except when they become inflamed.

From this growth is to be distinguished the "follicular tumor of Cooper," on the summit of which the aperture of the excretory duct of the sebaceous gland is distinctly seen; this tumor, therefore, does not form a completely closed sack, and occurs chiefly on the trunk; in other respects its structure resembles that of atheroma.

The follicular tumors rarely open spontaneously in consequence of inflammation; extirpation with the knife is therefore the best method of treatment.

4. Molluscum Contagiosum.

As the result of considerable accumulation of sebum in the glands, these become distended and form wart-like projections, on the surface of which there are plugs of sebaceous matter: short pedunculated tumors are thus formed, which vary in size from that of a pea to that of a man's fist. By pressing the sides of these tumors a milky fluid may be squeezed out. Molluscum occurs preferably on the face, scrotum, and penis: Bazin describes this affection as *acne varioliformis*. This disease is usually chronic, and occurs either in circumscribed parts or on the entire surface of the skin in the form of large or small tumors. I have seen it as an acute affection on the face of a woman (during pregnancy) in the form of tumors of the size of peas, which spontaneously disappeared during the puerperal state.*

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* Ebert (Berlin, klin. Wochenschrift, 1865) saw this disease in a child 4 years of age; the face being covered with 207 tumors.

Regarding the contagious character of the disease opinions are divided: Bateman and Paterson, later Bärensprung, and quite recently Virchow and Rindfleisch* consider this affection as undoubtedly contagious, but the experiments by inoculation made at our clinique, do not tend to confirm the opinion of these observers. The entire secretion (or only the nuclei) is regarded as the agent of contagion, and Virchow maintains that an endogenous cell-growth takes place, as in cancroid: he relates a case which occurred at the children's clinique of the Charité, where one child became infected by another.

Treatment. The treatment of this affection is local, and consists in squeezing out the contents of the smaller tumours by applying pressure, and in tying the pedicle (which is usually thin) of the larger, or in removing them by excision.

Condylomata subcutanea (endofollicular condyloma). To this group belong the subcutaneous condylomata, described by Hank and Zeissl, which occur in the sebaceous follicles of the genital organs and thighs, extending as far as the knee; they appear in the form of whitish-rosy and somewhat hard projections of the skin, varying in size from that of a pea to that of a millet seed. At the summits of these tumors the aperture of the follicle is observed as a small black point: on pressing the sides of these growths with the nails, sebaceous matter is extruded, and then a small structure presents itself at the aperture, which resembles the condyloma, and arises from the base of the follicle, but is unconnected with its lateral walls. This structure is racemose in form, and, according to Zeissl (Archiv fur Derm., u. Syphil., 1869, 1 Heft), is a morbidly enlarged sebaceous gland, in which the sebum is accumulated; he is, therefore, justified in disputing the term condyloma on anatomical grounds. The disease consists essentially in an enormous hypertrophy of the glandular part of the follicle. The mode of origin, however, is not yet demonstrated; Zeissl saw these growths after forced perspiration in puerperal women and in children, in the acute exanthemata, and once after a "forced sweat-cure" by the Preissnitz method. The subcutaneous condylomata sometimes disappear spontaneously from the inflammation produced by the friction of clothes, or after the smegma has been squeezed out; otherwise, they are best removed by the scissors.

Ossification and calcification (Hautsteine). We may lastly mention the osseous or calcareous change, which sometimes takes place in the skin, the so-called cutaneous stones. Under the skin moveable osseous masses are met with, which are follicular, or rarely fatty growths, in which a calcareous metamorphosis has taken place, the stroma having become ossified. The earthy substances are chiefly phosphate and carbonate of lime, associated with fatty and extractive matters. These concretions present different forms, and their size varies from that of a grain of sand to that of a nut.

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* The secretion of molluscum, according to Virchow, exhibits a lobular structure, the smegma being accumulated between regular and radially placed cylindrical cells; the soft mass consisting of epidermic cells and fat. In regard to the parasitic nature of these bodies, it may be observed that they somewhat resemble the globular psorosperms, which occur in the intestinal epithelium, but they are more like sebum. If these bodies took their origin in the epidermic cells or rete Malpighii, the disease might be regarded as a disturbance of secretion; but this is not the case. According to Virchow, quite analogous forms are met with in other epidermic tissues, where there can be no doubt as to their endogenous origin.

C. Decrease of Sebaceous Secretion (*Xerosis*).

When the secretion of sebum is deficient, the skin becomes dry, rough, brittle, and cracked; and either simple roughness *(asperitudo)* or desquamation (*pityriasis*) results. The skin is deprived of oily matter by too frequent washing with soap, and this happens especially in laundresses, servants, etc., the consequence of which is asperities and fissures. By a temporary cessation of this kind of work, however, and the application of oil, the skin soon regains its normal condition. This affection also occurs as one of the sequelæ of elephantiasis Græcorum, sclerema adultorum, prurigo, ichthyosis, lichen exudativus ruber, as well as sinile change in the skin. Wilson has treated of this disease under the term *xeroderma.*

Anomalies of the Sweat Secretion.

(Anatomy, see page 22.)

The sweat has not yet been chemically examined in its pure state, as it is always mingled with epidermic cells and sebaceous matter. The analysis of this secretion obtained from the entire integumentary surface gives the following result:

Chloride of sodium	2·230	Lactate of potash	0·317
Chlorate of potash	0·244	Sudoric acid	1·562
Sulphate of potash	0·011	Urea	0·044
Phosphate of soda	traces.	Fat	0·013
Earthy phosphate		Water	995·573
Albuminate of potash			

The chemical composition differs at different parts of the skin, especially in regard to the alkaline constituents.

When the temperature of the skin is raised by muscular exertion, external warmth, hyperæsthesia, section of the vaso-motor nerves, the agency of a damp atmosphere, or the use of warm drinks, the secretion of sweat is augmented.

It is only under morbid conditions that these agents fail to induce perspiration, or that the activity of the secretion is in abeyance.* The secretion is more profuse on those parts which are provided with numerous or large glands, as for instance, the forehead, the palm of the hand, sole of the foot, and axilla.† It has been calculated that 2560 grammes of sweat may be secreted in one and a half hours.

The epithelia of the glands contribute to the production of sweat, especially fatty and volatile acids, which render it strongly odorous. The fluid is supplied by the numerous capillaries of the glands. The sweat when fresh has an acid reaction; when profuse, or uræmic, or derived from the axilla and feet, it has an alkaline or neutral reaction, which is doubtless dependent upon rapid decomposition. A glass rod moistened with hydrochloric acid, and held near a person who is perspiring, emits fumes of ammonia.

QUANTITATIVE CHANGES OF THE SWEAT.

This secretion may be either diminished (*anhydrosis*) or increased (*hyperhydrosis*). *Anhydrosis* occurs either as a symptom of internal disease, as typhus, diabetes mellitus, hemiplegia, and cancer, or as the result of some skin diseases, as prurigo, psoriasis, and ichthyosis; on the other hand, there are individuals whose skin is plentifully provided with sweat glands, and yet who do not perspire even at high temperatures. There are also cases in which local absence of sweat is observed, as, for instance, on paralysed limbs, whilst on the healthy parts the skin is moist. In all such cases the normal secretion of sweat re-appears when the original disease is removed.

Hyperhydrosis may be either general or local; the first presents itself in different forms, the skin being either warm and turgid, or cold, pale, and shrunken. We may adduce as examples the perspirations in pneumonia, which rapidly evaporate, and those in phthisis, which remain on the skin for a considerable time, and when mingled with sebaceous matter and epidermic cells, produce those morbid conditions which we term *pityriasis tabescentium.*

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* A. W. Foot regards partial hyperhydrosis as dependent upon loss of power of the muscular arterial walls, and consequent distension of the arteries in the subcutaneous cellular tissue. The paresis of the vaso-motor nerves would appear to depend upon reflex, rather than direct causes. Thus Brown-Sequard and Barthez produced hyperhydrosis on the cheek by applying irritants to the mucous membrane of the tongue (Schmidts Jahrbücher, 1869).

† C. Reinhard (Zeitschrift f. Biologie, 1869) has shown that the secretion of sweat is most abundant on the cheeks, less on the palm of the hand, and still less on the forearm.

The first results from pressure in the blood vessels from the augmented action of the heart, the other from the diminished power of resistance of the organic tissues. Besides these there are to be noticed the perspirations which arise from excess of blood in the right side of the heart and the veins of the body, as in cyanosis and diseases of the heart and lungs.

The above-mentioned perspiratory conditions are only of interest to the dermatologist, in so far as they produce the changes in the skin, which we term sudamina *(miliaria)* and intertrigo.

The profuse secretion of sweat as a local affection *(hyperhydrosis localis)* is much more frequently met with, and occurs especially on the soles of the feet, the hands, the axillæ, and the genito-crural and anal folds. Hyperhydrosis of the soles of the feet is one of the most disagreeable forms of skin disease, from its offensive odour, both for the patient and those around him. This affection, when of long duration, is accompanied not only by the unpleasant sensation of moisture, but also by pain. The epidermis becomes macerated by the sweat, and is thrown off, so that the pressure of the foot in walking causes great pain, which is increased by the fissures (rhagades) formed on the toes. The offensive odour arises from the rapid decay of the secretion which is absorbed by the coverings of the feet; and that this is the case is shown by the fact that when the feet so affected are cleaned and washed the fresh secretion never emits an offensive odour. The increased secretion of sweat on the hands is not attended with any further effects in slight cases; but when of long continuance, the skin on the palm becomes paler, macerated, and painful. The profuse perspirations of the axillæ and genito-crural and anal folds occur chiefly in corpulent individuals, and frequently induce erythematous affections (intertrigo), which sometimes develop into obstinate cases of eczema.

Qualitative Changes of the Sweat.

These changes have unfortunately been but little examined, and are only recognized by the odour and colour of the secretion. As the odour is merely a subjective perception, the data afforded thereby are very indefinite; this odour probably depends upon butyric, formic, and acetic acids. Cases are related of musk-like odour in peritonitis, and others in which it resembled sulphuretted hydrogen gas. In syphilis the sweat is said to be sweetish; in gout, acid; in scurvy, putrid; in struma, like beer; and in intermittent fevers, like fresh rye-bread. Schönlein is said to have diagnosed measles and scarlatina from the odour. The statements regarding blue,* green, and black sweats are mythical, according the Hebra.

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* Dr. Kollman has recorded a case of *cyanydrosis* (blue sweat), (medicinish-physikalishen Gesellschaft zu Würzburg) in which the secretion was chemically examined by Prof. Scherer, which deserves notice.

The case is that of a man, 40 years of age, of sallow complexion, in whom the affection commenced gradually, and became developed during many years; the internal organs were healthy, and the patient only suffered from attacks of giddiness, palpitation of the heart, great restlessness, and melancholy. There was also considerable vascular injection on the face, conjunctiva, and hands. These attacks were followed by a feeling of unusual prostration; the patient also suffered severely from profuse night sweats; and there were also occasional hæmorrhoidal hæmorrhages.

Sweats appeared on the scrotum and its vicinity, as well as on the inner surface of the thighs (but on no other parts), which were colourless at first, then assumed a light blue tint, which gradually became more intense till it attained a deep indigo blue. During the winter months, the patient took two or three baths weekly, besides which, frequent washing was prescribed, nevertheless the blue sweats continued to appear, and coloured the patient's clothes at the above mentioned parts.

The chemical analysis made by Prof. Scherer, showed that the blue colour of the sweat depended upon phosphoric acid and oxide of iron. On microscopic examination of the blue masses, separated from the surface of the scrotum by pincers, the contained tissues (epidermis, hairs, etc.) were found colourless, whilst, on the other hand, the extraneous particles (woolly fibres) derived from the clothes, presented brownish, violet, or blue colours; besides these, there were also isolated dark-blue aggregated particles. The colouring matter was insoluble, both in water and glycerine. The colour of these woolly fibres was not removable by potash or ammonia, but by sulphuric and nitric acid. There was no appearance of *vibriones*. In no other secretion, neither in the saliva nor in the urine, was there any blue colour.

In reference to the blue colour of the sweat, it was most intense after the administration of preparations of iron. It is obvious that iron and quinine were only given when the symptoms were most severe, but later, the employment of these tonics was substituted by nutritious and strengthening food.

Whilst admitting that the blue colour was most intense during the use of the preparations of iron, we must not overlook the fact, that it was still observable for 10 or 11 months after the employment of iron, both internally and externally, had been suspended. After this time the blue colour disappeared: Kollman describes this form of chromydrosis as *cyanydrosis*.

In medical literature there are recorded a few cases of blue sweat (Würtembergishen Med. Correspondenzblatt vom Jahre, 1835). A case occurred to Dr. Bleyfuss, of Köttingen, who observed for a long time that the perspiration of his own feet contained a blue pigment. Dr. Michel noticed the same phenomenon on his right axilla; and both of these observers are quite convinced that this colour did not arise from the clothes. Bizio found indigo; Fordas, pyocyanin. Other cases are recorded by Heyfelder, Bergmann, and Ignaz Surdon, of Siegmaringen, and by Ferrand. The first relates that a hypochondriacal and emaciated man of 40 years of age, and a hysterical woman of 50 years of age, who both suffered from affections of the liver, were subject to blue sweats, especially on the right side from the axilla to the foot, which were certainly not produced by the clothes.

The yellow tint in jaundice is not due to the sweat, but to the presence of gall-pigment in the cells of the epidermis.

The "blood-sweat," the existence of which has been affirmed by credible authors, occurs chiefly in chlorotic women, and may arise from the lacerable condition of the walls of the capillaries of the sudoriparous glands during intense excitement. These cases are not properly blood-sweats, but rather extravasations in the sudoriparous glands.

The excretion of urea by the perspiration in cholera, ecclampsia, purturientium, and morbus Brightii, is an established fact; but it has not yet been ascertained whether sugar occurs in perspiration as a morbid product of excretion. Leube (Centralblatt. f. Med. W. 1869, 39) has recently demonstrated the excretion of albumen by perspiration.

The observations in regard to the excretion of medicinal agents by the perspiration are still insufficient. Quinine and salicine are not excreted, and iodine only after having been administered for a long time; but the presence of tartaric, succinic, bensoic, and cinnamic acids, and of arsenic, has been demonstrated.

Treatment. In most cases local hyperhydrosis is curable. As regards the treatment of profuse perspiration of the feet, the stockings must be first removed in order to get rid of the offensive odour, after which the feet must be thoroughly cleansed and enveloped in linen, on which the following ointment has been spread: *Empl. diachyl. simplic. liquefacti olei lini, aa. partes æquales* (Hebra); or, *Emplast. diachyl. simplic. liquef.*, *emplast. lithargyr. fusc. cum. oleo lini.* This method of treatment is employed during nine days, in which period the application is renewed three times, *i. e.* every third day. In most cases this suffices for the cure; besides this, however, baths containing astringents (dct. querc., etc.), and washing with iodide of sulphur soap are prescribed. We may also advise such patients to sprinkle the socks with cream of tartar, and to apply dry charpie powdered, with starch and cream of tartar, between the toes. The use of caustics, which has been recommended by some, is unnecessary.* In hyperhydrosis of the axillæ and hands the same remedies are to be applied.

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* A Gaffard recommends a mixture of 1 gramme of red oxide of lead with 20 grammes of lead lotion to be dropped between the toes, which he regards as the principal seat of the affection. This treatment repeated every week (and every day in summer) is said to effect the cure, and to prevent a relapse.

CLASS II.

INFLAMMATORY AFFECTIONS.

The skin and mucous membranes are the organs which afford the best clinical observations of the phenomena of inflammation. The inflammatory process is now regarded as consisting chiefly in a vascular disturbance,—hyperæmia and stasis,—as well as in a morbid condition of the tissues. Hyperæmia produces various shades of reddening of the skin; this hyperæmic condition *per se* is, however, transitory, and is not to be regarded as associated with, or indicative of a more deeply-seated disturbance. When hyperæmia is of long duration, reaching the condition of stasis, accompanied with exudation, it implies a high degree of inflammation. As the result of the augmented intra-vascular pressure, serous exudation into the surrounding tissues takes place, which may be excreted by perspiration in a short time, but also as rapidly re-absorbed: instances of this are afforded by urticaria and several forms of erythema. This serous exudation is therefore to be regarded as the mildest form of local inflammation, producing only the sensation of itching or burning; and even these sensations may be absent without the occurrence of a morbid process in the deeper tissues, or of a general febrile disturbance. The tissues themselves having become involved in the morbid process from the augmented supply of blood to the part, a more active growth takes place, producing a proliferation of the cell-elements, most probably in the situation in which the separation of the elements of the tissues normally occurs, and the phenomena of inflammatory infiltration are thus produced.

The more severe form of the inflammatory process is attended with suppuration. The exudation as such, is not purulent, but new cell-elements are formed—pus-cells, which are partly derived from the blood which has traversed the vascular walls, as Waller and Cohnheim have shown; the tissue-elements themselves, however, partly constitute the substratum from which the new cells originate by separation and endogenous growth.

The primary cellular tissue is not in the first instance involved, *i. e.*, the young cells cannot be distinguished from the embryonic cells (granulation tissue). If the inflammatory process increases, suppuration takes place, of which we shall presently speak; if, however, this process subsides, structures, especially connective tissue, are gradually formed from the primary cells. The clinical phenomena of chronic inflammation depend upon such an infiltration, with excessive growth of connective tissue; and evidently the line of demarcation between chronic inflammation on the one hand, and hypertrophy and tumors on the other, is not absolutely traceable. This process has only recently been demonstrated by Stricker, W. Norris, and L. Oser.*

Suppuration is always accompanied with destruction of tissue; but when pus is formed only in the superficial layers of the papillary body, and when the destruction of epithelium is inconsiderable, then the loss of substance may be completely replaced without the formation of cicatrices. If the suppurative process involve the entire cutis, leading to the loss of considerable portions of the epidermis, the reparation takes place by means of transitory tissue (granulation tissue) instead of cicatrices. As instances of superficial suppuration which may terminate without cicatricial formation, are to be adduced all vesicular and bullous eruptions, as herpes iris, eczema, pemphigus, etc. In herpes zoster and pustular eruptions we find instances of suppuration extending more deeply, and healing with cicatrices.

Diphtheritic inflammation constitutes the third form, in which neither the exudation nor the suppuration is *per se* deleterious, but probably a *materies morbi* (vegetable parasite ?), derived from external infection, affecting the seat of inflammation, producing rapid destruction of the parts involved as well as of the healthy tissues in the immediate vicinity, and presenting that morbid process which is clinically described as *gangrenous* or *diphtheritic* ulceration.

In grouping the inflammatory skin affections we have been guided chiefly by etiological considerations, not on account of scientific accuracy, but because it renders more intelligible clinical phenomena. We distinguish, therefore, first, inflammations which originate by contagion; second, those arising spontaneously; and third, those which are traumatic in their origin.

A. Contagious Inflammatory Affections.

a. Acute, typical course.

1. SMALL-POX *(variola).*

History and Pathology. There is great difference of opinion as to the time of the first appearance of variola. Whilst some authors state that it prevailed in China even 1500 years before our era (as a malady sent from heaven), and that about the same time, in

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* Studien aus dem Inst. f. exp. Pathol. in Wien, 1870.

India, a particular goddess was worshipped as a protectress against it; others maintain that, according to the *codex medicinæ* of the Chinese, small-pox appeared only in the seventh century. The terms *ἐξανθεματα μελανα, ἀνθρακες πολλοι, ἐκθυματα μεγαλα*, used by Galen and Hippocrates are believed to apply to variola, and even the plague, described by Thucidides, which raged in Athens during the Peloponnesian war, is assumed to have been an epidemic of variola. It is also related that during the retreat of Alexander the Great from India, this plague appeared in his army; and, according to Dionysius of Halicarnassus, small-pox prevailed in Rome 301 years after the foundation of that city. All these statements, however, are somewhat doubtful, owing to the inaccuracy with which the disease was described.

From Mahomet's time we have the first reliable data concerning variola; and the Koran relates that in the so-called Elephantine War a flock of miraculous birds dropped stones of the size of peas upon the Abyssinian army, which destroyed a great number of soldiers.

Razes, an Arabian physician, who practised in Bagdad in the tenth century, is the first who explicitly treats of variola; and, amongst others, he mentions as an authority a physician of the name of Aaron, who is said to have flourished in Alexandria in the year 622,—the time when Mahomet first appeared as conqueror and prophet.

It is probable that the success of the Saracenic arms in Spain and Sicily during the eighth century extensively promoted the spread of variola in the various countries of Europe; and we find in the British Museum a manuscript, believed to have been written in the tenth century, which contains a prayer against small-pox, and Nicasius was the saint whose protection was implored in England when the disease raged in the year 907.

Since the Crusades, or rather in consequence of them, variola was known as a prevailing popular disease, and particular plague-houses were erected in order to prevent its spread, and to afford protection to the infected.

Soon after the discovery of America, Europeans spread small-pox among the aborigines of the newly discovered countries, and according to Spanish authors, three and a half millions of the inhabitants of Mexico alone died of this disease. Amongst the victims was the brother and successor of the brave and unfortunate Montezuma. In Haiti the whole population was exterminated by variola, and in Brazil several tribes met the same fate.

Those countries which the sea-faring Spaniards and Portuguese did not invade, were soon visited by the Dutch and Danes, who carried with them the infection of small-pox. In Iceland alone 20,000 of a population of 50,000 became victims to the disease. Amongst the aborigines of the Faröe Islands, the North Cape, and Greenland, variola extended its ravages, and the virulent character of the disease is evidenced by the fact that amongst 2000 infected persons only 7 escaped death. At the same time (1767) the epidemic prevailed in Siberia and Kamtschatka, and the latter country was nearly depopulated.

There are few countries which have as yet escaped the ravages of small-pox, and from time to time fresh epidemics of virulent character have arisen in all parts of the world; thus in Europe alone this disease annually proved fatal to more than half a million of the inhabitants.

Description. Small-pox (variola) is an acute contagious skin disease, attended with fever, and the formation of a general eruption on the skin. These efflorescences consist of papules which soon become transformed into vesicles, pustules, and crusts, which run a typical course.*

Forms of variola. According to the intensity of the variolous process, *three* forms are distinguished.

1. *Variola vera,* lasting 31 days.
2. *Variola modificata,* or *varioloid,* lasting 21 days.
3. *Varicella,* lasting 14 days.

The morbid process in these three forms is identical both in the anatomical change and external aspect, the only difference being in the intensity of the disease. In variola vera the eruption is more abundant than in varioloid, and in the latter more than in varicella.† The duration of the disease, which always corresponds with the extent of the eruption and the intensity of the symptoms, is therefore the only distinguishing character of the several forms of variola. The "umbicle," which was formerly regarded as peculiar to variola vera, occurs in all forms of the disease, or is entirely absent, especially when the pustules are small; it is observed not only on the general integument but also on the mucous membranes of the mouth and pharynx. Further, the umbicle is not seen only in variolous pustules but also in those produced by the inunction of croton oil or *Authenrieth's* ointment; it is also observed in herpes zoster, and in most of the affections of the hair-follicle.

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* The term *contagion* has in recent times acquired a more definite signification, in so far as it expresses the agency of *fungi.* It is believed that in variola, measles, scarlatina, petechial typhus, and syphilis, these organisms exist in the blood (Hallier), although the investigations are not yet sufficiently advanced to admit of definite statements.

† Thomas accepts the *specific* character of varicella for the following reasons: The formation and retrogression of the pustules are more rapid, and epidemics of varicella occur more frequently than those of variola: vaccination is not protective against the former; children are especially liable to it; there are no premonitory symptoms; the eruption frequently appears at the end of the first day. The contents of the pustules of varicella are not inoculable. The period of incubation also is not constant, as in variola.

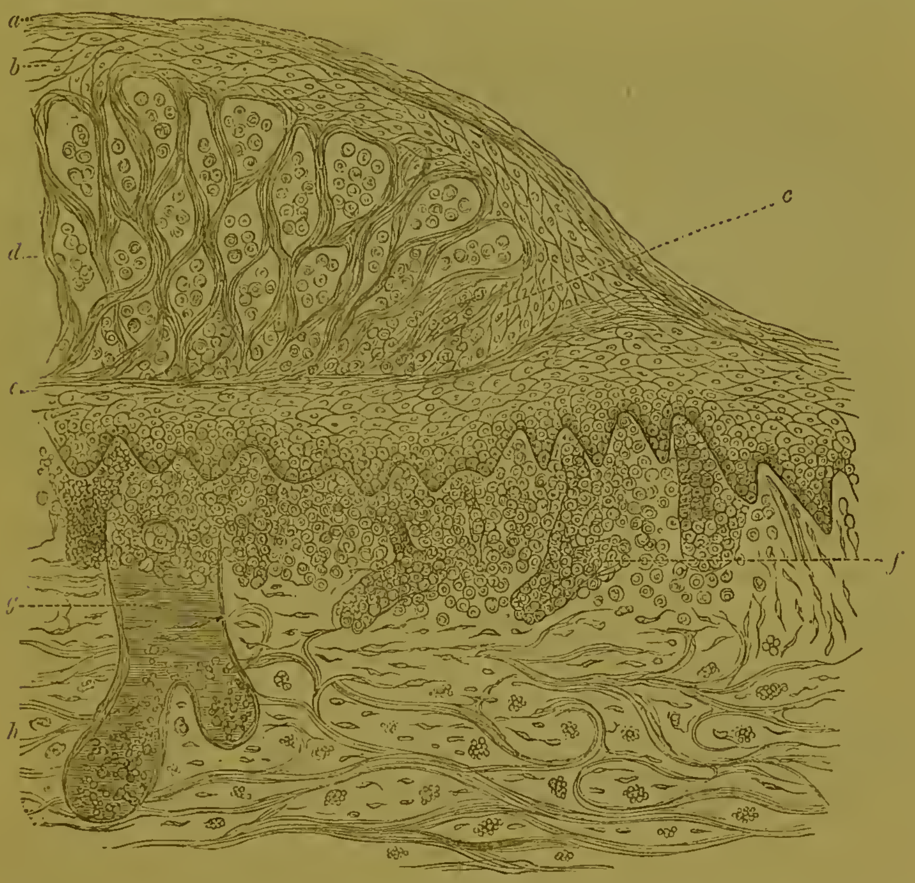
Anatomy. Rayer, Fuchs, Bateman, Alibert, and especially Simon, regarded the structure of pustules as cribriform, mesh-like or cellular; v. Baerensprung and Hebra, however, dissent from this view.

Ebstein, of Breslau, found a layer of nucleated cells, the limits of which, above and below, were the Malpighian and epidermic strata. The superficial pustules are developed in this layer, but sometimes extend deeper; they usually exhibit no mesh-work, and if this exists, it is formed of transverse strands of closely-compressed epithelial cells, in the interstices of which pus-cells are embedded. The pustules which extend deepest into the skin are developed in the deeper layers of the rete Malpighii. The newly-formed layer of the rete Malpighii, which lies above the papillæ, becomes infiltrated with cells, and by the active cell proliferation cavities are formed over each papilla, which are filled with pus-cells, the base of these spaces being formed by the papilla, the roof by the superficial epidermic layer, and the walls by the denser layer of the Malpighian cell which have not been destroyed. The number of loculi in each pustule will correspond with that of the papillæ which go to form it. In the suppurative stages the septa (between the loculi) are destroyed, and at most only their remains are found.

The examination of pustules by Auspitz and Basch, whose observations I can fully confirm, and here describe and illustrate, gave the following results: papules on the *fifth* day of the disease, *i.e.*, the *second* of their existence; the epidermis is elevated, apparently from the increased thickness of the rete Malpighii, the individual cells of which are larger than those of the neighbouring normal parts. The nuclei are enlarged; the vessels of the corium, as well in the papillary region as for some extent under it, are distended; on their walls are numerous small roundish cells, and similar cells in the stroma of the papillæ. The papillæ and glands are unchanged.

Vesicles. Under the epidermis there is a layer of longitudinal cells, which merge uninterruptedly into the roundish or flattened and distinctly swollen cells of the rete Malpighii. Beneath this a mesh-work is seen, which is nearer the epidermis than the corium, and occupies a great part of the breadth of the vesicles, but does not extend deeply. This mesh-like structure consists of tranverse septa of fine fibrous tissue, which are evidently formed of the compressed spindle-shaped cells of the hypertrophied rete Malpighii; in its interstices pus-cells are embedded; some of the large cells containing ten or more small ones. Under this mesh-like, structure, and extending between the papillæ, there are found roundish cells, which either resemble those of the mesh-work or the swollen

Fig. 9.



Vertical section through half of a pustule in process of retrogression (250 Diam.) (*Auspitz*). *a.* Old epidermis. *b.* Rete Malpighii covering the mesh-work. *c.* Swollen lateral cells of the mesh-work. *d.* Mesh-work with enclosed pus-cells. *c.* Newly formed epidermis. *f.* Vessels surrounded by cells. *g.* Part of a sebaceous gland. *h.* Corium.

Malpighian cells. The under-lying papillæ appear broader, and those in the immediate vicinity of the vesicles lengthened: proliferation of cells is observed around the vessels.

Pustules. The mesh-work stretches out still more towards the corium, and increases in width from the centre to the periphery; in the interstices there are round cells. The vessels of the papillæ are surrounded by a mass of compressed cells (Convolut), which dictinctly merge into connective-tissue corpuscles at the margin. The pustular contents are enclosed, as if by a capsule, by two layers of unnucleated epidermic cells. Besides the pus-cells, there are also nucleated elements (insoluble in acetic acid), with fine granular contents.

The inflammatory process usually terminates by the formation of a new epidermic layer beneath the pustule, the contents of the latter being thus gradually expelled and drying into a crust, under which either the rete Malpighii re-assumes its normal condition, or an ulcer results.

The umbilicus of the vesicle is a simple depression of the epidermis (primäre Delle); when desiccation takes place the secondary pitting results. Whilst the swelling of the cells increases towards the outside, the pus, which was slowly accumulated, is enclosed (as if by a capsule) by the swollen cells of the periphery, which gradually enlarge, although the formation of pus in the centre does not always correspond with the increase of space. The lateral cells of the rete Malpighii absorb only partially the fluid slowly collected in the centre, the papillary body becomes depressed in the middle, and the epidermis, therefore, which is supported laterally by a closely aggregated mass of cells, sinks in the centre where the support is absent.

Purpura variolosa. With the most intense febrile disturbance and great restlessness, the skin assumes a scarlet hue, and there is developed an eruption of separate vesicles (not usually elevated above the surface) which are produced by hæmorrhagic effusion into the hair follicle; at the same time there occur also hæmorrhages in other tissues, in the sclerotic, lungs, intestinal mucous membrane, kidneys, and bladder, leading to the discharge of blood in the fœcal masses and urine. The patients are extremely restless, the breathing becomes oppressed, especially when œdema of the glottis occurs. The fatal result takes place from suffocation after two or three days.

Erismann has recently studied *purpura variolosa* or *variola hæmorrhagica*[*] (Fig. 10). The distinction between variola vera and v. hæmorrhagica, is that in the latter the corium around the hair-follicle first becomes the seat of the inflammatory process, which extends deeply involving the papilla of the hair: there is abundant exudation of cells around the vessels (Fig. 10, *d*). The sheath of the hair-follicle itself soon becomes infiltrated (*c*). In a somewhat later stage the root-sheath of the hair is penetrated by the cell-exudation, and the shaft of the hair is raised from the follicle (*f*), and left more or less destroyed. The sebaceous glands share a similiar destruction, and in the eruptions of the longest duration we find the hair-shaft sticking in the centre of a small abscess, either isolated or still enveloped in a thin layer of the inner root-sheath. The Malpighian layer only slightly participates in these morbid changes; in it also, however, are cell-exudations, but the epidermoidal cells do not undergo any change of form; there is no formation of vesicles.

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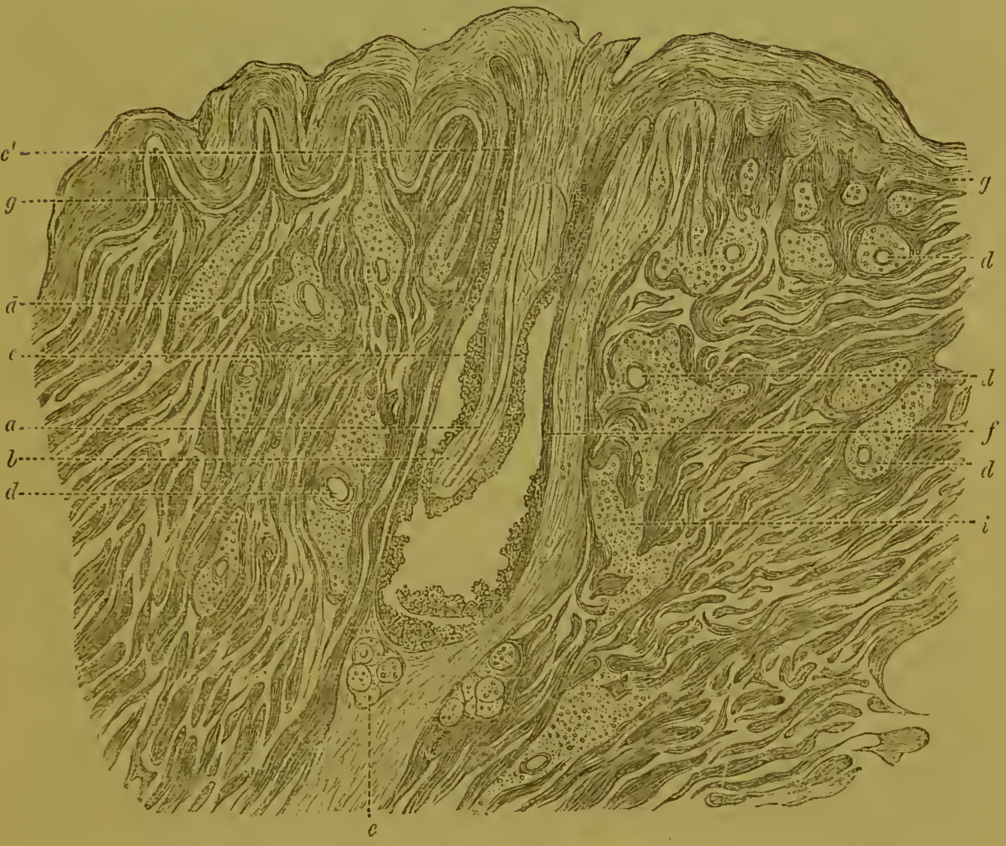
[*] Sitzungsb. d. Kais Academie, 1868.

Fig. 10.



Section of skin in variola hæmorrhagica (*Erismann*). *a.* Hair-shaft surrounded by—*b.* Remains of inner root-sheath. *c.* Exudation occupying site of destroyed outer root-sheath. At *c* the exudation penetrates into inner root-sheath (which extends to epidermis), splitting it into two portions. *d.* Vessels of corium surrounded by cell exudation. *c.* Sudoriparous gland. *f.* Sheath of hair-follicle. *g.* Rete Malpighii. *i.* Cell exudation around hair follicle.

Course of variola. We distinguish in small-pox the following stages:—stadium prodromorum, s. eruptionis, s. floritionis, and s. decrustationis.

Stadium prodromorum. The premonitory stage is characterised by febrile symptoms, pains in the joints, back, and also at the scrobiculus cordis. The intensity of these symptoms does not at all indicate the intensity of the disease, for severe febrile symptoms may precede a mild attack of small-pox. In some cases redness of the skin appears in the form of roseola or erythema. There are exacerbations in the evening, which become more intense every day. This stage lasts from 24 hours to 3 days, seldom longer, and when this is the case the prognosis is unfavourable, as also in drunkards and pregnant and puerperal women.

Stadium eruptionis. In this stage the febrile and other general symptoms continue. When the eruption is abundant, it appears first on the face (var. vera), if scanty it usually occurs earlier on the trunk (varicella). In this stage the disease may be confounded with *morbilli papulosi,* and sometimes also with *erythema papulatum,* and we can only arrive at a certain diagnosis on its further development during the next 24 hours. Small-pox may occur at the menstrual period, or the menses may appear abnormally during this stage of the disease. In varicella this stage is frequently very short.

Stadium floritionis. In all forms of variola the vesicular precedes the pustular stage, but the period of transformation varies; in variola vera 6 days, in modificata 4 days, and in varicella 2 days. In variola vera this period may extend over 10 days, and the formation of the pustules (which often appear dark-coloured from the presence of blood) is latest on the extremities. If we calculate from the commencement of the disease, the formation of pustules in variola vera begins on the *tenth,* in modificata on the *sixth,* and in varicella on the *fourth* day. In this stage the febrile symptoms decline, and in modificata and varicella they entirely disappear, whilst in variola vera there are some later febrile exacerbations.

Stadium decrustationis. The desiccation takes place in the same order as in the preceding stages; in varicella from 2 to 6 days, in variola modificata from 7 to 14 days, in variola vera from 14 days to 6 weeks; and it is understood that the crusts are detached after these several periods. The anatomical differences in the efflorescence do not afford any criterion of the rapid or gradual desiccation; chemical differences, however, may account for this phenomenon. In general it may be stated that the milder the disease the more rapidly desiccation takes place. The patient cannot be considered out of danger so long as the desiccation is incomplete.

Occurrence of variola on mucous membranes. It is not a new observation that the variolous process extends to mucous membranes, and that the efflorescence there produced is similar to that of the general integument; nevertheless, the anatomical structure and the differences in its course from that of the skin have not yet been fully examined, and some observations on this subject may not be without interest. The differences are chiefly apparent in the course of the eruption, and find their explanation, on the one hand, in the structure of the mucous membrane and its glands, on the other, in the temperature and quantity of its secretion, and lastly in the diminished access of atmospheric air; these several conditions tend to produce a more rapid growth, transition, and disappearance of the efflorescence. Whilst on the general integument the swollen follicles are observed in the form of papules at the beginning of the fourth day; on the mucous membranes, on the other hand, an aptha-like efflorescence (of the size of a pin's head) on a reddened and swollen base is seen; the capsule of these papules is still tense at this period, and force has to be employed in order to remove them. On the removal of such a papule, *e.g.* from the mucous membrane of the lip, we can perceive, even with the naked eye, its macerated and lacerable condition. Miscroscopic examination shows that it consists partly of normal and partly of swollen (enlarged) epithelial cells, further of free nuclei with granular corpuscles and pus-cells in moderate number. A later examination, *e.g.* on the fifth or sixth day, shows fewer normal epithelial cells and an increased number of pus-corpuscles: the still existent epithelial cells, however, are strikingly changed, some of them exhibiting from two to four nuclei which enclose granular corpuscles.

The efflorescence on mucous membranes increases both in quantity and size, especially in transverse diameter, during the first days, and although the formation of vesicles on the general integument is not yet completed, those on the mucous membrane are frequently in process of shedding. As the epithelium of the mucous membrane and also its glands are more delicate than those of the general integument, the elevated epithelial capsule soon bursts into the centre as the result of the increasing exudation under it, allowing the escape of the fluid contents, and this point is marked by a depression at which the reddened mucous membrane is seen; on the mucous membrane of the lips even the apertures of the mucous glands can be distinctly perceived by means of a lens.

These phenomena take place during the first two days of the existence of the efflorescence; in the periphery, however, the epithelial capsule still adheres, the time of its disappearance varying from 6 to 16 days. In varicella the shedding takes place soonest, and in the beginning of the eighth or ninth day there is usually no trace of the variolous eruption, or it is only indicated by dark spots. In variola modificata the entire process occupies the first sixteen days, whilst in variola vera recovery takes place about the twenty-fourth day or somewhat later. The recovery is protracted in those cases of small-pox in which the variolous process has been intense, the exudation having extended to the deeper layers of the mucous membrane and sub-mucous areolar tissue: this is frequently followed by a loss of substance in the mucous membrane as the result of suppuration, which is replaced by cicatricial tissue. The rare occurrence of *desiccation* on mucous membranes may here be mentioned. Although on the general integument each pustule is accompanied by a corresponding crust, the hard and soft gums are covered with a uniform crust several lines thick, on the removal of which the mucous membrane presents an excoriated surface, covered with patches of whitish exudation. This formation of crusts occurs in the several forms of variola, especially in those in which the pustules are so numerous on the nasal mucous membrane that the patient has to breathe only through the mouth, where the eruption consequently is exposed to the influence of the atmospheric air, and thus becomes desiccated with the secretion of the mucous membrane.

These observations have been made on the pustules on the mucous membrane of the lips and mouth, but variolous pustules also occur on other parts of the mucous membrane, which, however, are not so conveniently situated for inspection—as on those of the nose, pharynx, upper third of œsophagus, stomach (rarely), epiglottis, larynx, trachea, bronchi (as far as their third division), urethra, rectum, nymphæ, conjunctiva palpibrarum, and bulbi, and outer auditory canal. I have not found any eruption on the vagina, or the vaginal portion of the uterus, even in those cases in which a prolapsus uteri or vaginæ existed, although this has been noticed by some authors. The variolous process in the intestinal canal is also accompanied by catarrhal ulceration, which causes profuse diarrhœa; thus Robert describes an epidemic in Marseilles, in which the variolous process chiefly affected the intestinal canal; and Dressler an epidemic amongst sheep, in which the liver was the principal seat of the disease (?).

The occurrence of the variolous process on certain parts presents special features of interest: thus the excretory ducts of the

Meibomian follicles are frequently affected, the eye-lashes being glued together by the discharged contents of the pustules. On the palpebral and ocular conjunctiva pustules do not occur, but only vesicles, and these rarely: ulceration and perforation of the cornea is very rare, and occurs only as a metastatic phenomenon. Amongst the numerous cases of small-pox which have come under my observation, the loss of one eye occurred in ten; in one woman who had been re-vaccinated, and who was suffering from a second attack of variola, metastases occurred in the lungs, which proved fatal. Amongst the other patients, in whom considerable injection of the ocular conjunctiva and of the vascular zone around the cornea was earlier observed, there sometimes appeared an ulcer at the upper margin of the cornea within a few hours, the tension of the globe was increased, the aqueous humour became turbid, and within twenty-four hours, in spite of puncture and the use of atropine, the entire upper half of the cornea was destroyed, the ulceration extending to the membrane of Descemet. In a few days anterior staphyloma with prolapsus of the iris was formed.

The pustules on the tongue are usually large, and are most abundant and largest on the lower surface. The entire tongue is rarely involved in the morbid process, but when this happens it increases considerably in bulk, and is protruded between the teeth, hanging from the mouth like a lump of flesh; and in such cases even suffocation may be induced. The course of the variolous eruption in the fauces, pharynx, epiglottis, larynx, and trachea, can be ascertained by means of the laryngoscope. In many cases as soon as the eruptive stage has commenced, a successful examination can be made without difficulty. It is known that on the enumerated parts deep ulceration may sometimes be produced by the variolous process: we will only mention one case which proved fatal during the eruptive stage, in which the mucous membrane of the pharynx and trachea was entirely denuded of its epithelium, and covered by a diphtheritic exudation half a line in thickness, under which the reddish-brown mucous membrane was generally swollen to the thickness of a line, and showed the pitting of variola. These morbid changes extended also to the bronchi as far as their third division, whilst the mucous membrane of the finer bronchi was swollen and of a dark red colour.

We may also direct attention to the pustules on the external auditory canal, which occur, however, but sparingly and only in the cartilaginous portion, whilst they have not yet been observed on the osseous part or on the tympanum; and we only find on the latter parts an abundant secretion, on the removal of which the lining membrane appears loose, and the tympanum turbid. It is well known that chronic otorrhœa and even deafness may remain as sequelæ of the variolous process.

The extent of the eruption on the mucous membranes usually corresponds with that of the external integument; there are, however, cases of varicella and varioloid in which the entire mucous membrane of the hard and soft palate is completely covered, whilst in variola vera this sometimes occurs only to a small extent; there are also cases of varicella in which not a single pustule exists on the mucous membrane of the mouth.

The above-mentioned fact, that we frequently find the eruption fully developed on the mucous membrane of the mouth on the fourth day, whilst only papules are observable on the skin, affords in certain cases diagnostic data, as, for instance, when the diagnosis between variola and morbilli papulosi is doubtful; in a later stage also this may determine the distinction between acne disseminata and varicella.

The symptoms caused by variola on the mucous membranes of the alimentary and respiratory tracts are :—acute pain in swallowing (which is sometimes so severe in infants that they refuse all nourishment and die of inanition), flow of saliva, hoarseness, and when the disease extends to the bronchi, the symptoms of bronchitis. The latter affection is induced, not so much by the variolous process itself as by the acute exanthem and accompanying catarrhal inflammation of the mucous membranes.

Anomalies in course of variola. The pustules frequently occur so numerously as to become confluent; on the face and arms, instead of separate pustules, we often find large cavities undermined by pus. In other cases the pustules are only of the size of a millet-seed *(variola miliformis)*, or become developed into large bullæ *(variol. pemphig.)*; the latter are distinguishable from the blebs filled with yellow serum, which occur during the stage of desiccation on those parts free of crusts. After the shedding of the crusts there sometimes appear small wart-like eminences (*variola verrucosa*), which are produced by the accumulation of sebum in the follicle, and disappear on the application of the remedies employed in seborrhœa. During the stage of desiccation each pustule frequently become surrounded with an elevated ring, containing pus (*rupia variolosa*); this condition is attended with febrile disturbance, erysipelas, or pyæmia, which sometimes lead to a fatal termination.

In cases in which the febrile disturbance is permanent and severe, purulent deposits from the absorption of the pustular contents may take place in the skin after the tenth day; these deposits occur in the form of abscesses or furuncles, or a diffused deposit takes place over considerable portions of the skin. During the last days of the eruptive stage, or in that of desiccation, the patient experiences acute pain at these parts, which at first may not be increased by pressure, and is inexplicable from any external symptoms until œdematous swelling, with indistinct fluctuation, is observed; on puncturing these parts ichorous pus is found in the interior. The development of a hæmorrhagic bulla sometimes follows the severe pain, and is indicative of gangrene and of a fatal termination. The destructive process extends rapidly, and after a week the soft parts are reduced to the condition of a tinder-like scurf. The internal organs also, especially the lungs, become the seat of purulent deposits.

Prognosis. In variola the prognosis is usually favorable. It is only during early infancy that we may expect an unfavorable result; the children at first appear quite well, but soon the voice becomes hoarse, they throw the head backwards, refuse the breast, and nutriment has to be given by injection; at last this also becomes impossible, and death takes place after two or three days. The prognosis is also less favorable during pregnancy and the puerperal state; abortion or premature labour may be anticipated almost with certainty. In drunkards, cachectic individuals, and those who are recovering from severe diseases, the prognosis is also less favorable.

Treatment. The eruption of small-pox is not retarded either by a warm or cold temperature, and equally futile are pressure on the skin, astringents, or caustics. Hebra treated the disease experimentally according to the method of Priessnitz, and effected a cure: he applied strips of adhesive plaster to the extremities, and fewer pustules were formed, probably on account of the diminished supply of blood to the skin. The *Unguent, hydrarg.* and *Emplast. mercurial. de Vigo* were of little use, as also collodion. Corrosive sublimate applied in bandages and baths, from which coagulation of the albumen was anticipated, was not attended with any good result: the strength of the solution employed for bandages is 5 gr. to 1 st., for baths 2 drs. to ½ oz. to 10 glls. of water. The ectrotic method (destruction of pustules by caustic) is useless and painful, as is also the puncture of each pustule. The formation and shedding of the crusts is sometimes accelerated by painting once or twice daily,—

commencing from the fourth to the tenth day of the disease,—with tincture of iodine (1 scrpl. iodin. to 1 oz. alcohol) and ferri sesquichlor. (1 dr. to 1 oz. of water).

In the regular course of variola, treatment is unnecessary, as a remedy would be only of service which would either prevent the outbreak of the disease, accelerate its course, or delay the re-absorption of the pustular contents. In ordinary cases we administer no medicine, and give nothing but water and soup as drinks; in the case of drunkards, opium in doses from 6 to 10 gr. daily, or wine, is to be recommended; when there are attacks of shivering, quinine in doses from 10 to 20 gr. may be given with advantage.

The experience that the outer surface of the lips becomes covered with thick crusts from the action of the atmospheric air, whilst the inner surface is free from eruption in consequence of maceration by mucus and saliva, induced Hebra to subject the skin to a similar maceration. With this object one of the extremities was enveloped during the eruptive stage in warm and moist cloth, which was covered with oil-silk. By this means the evaporation of the fluid contents of the eruption is prevented, as also the action of the atmospheric air, which undoubtedly favors the more rapid decay of the accumulated exudation; the epidermis also thus becomes macerated, shrivelled, and eventually thrown off. The first experiments by this method confirmed these views: as on examination of the parts thus treated after a few days, it was found that the pustules were less tense, their capsules softer, their contents clearer, and the œdema less extensive than on the corresponding parts which had not been experimented upon.

We have only the experience of one case of variola vera, which was treated by the *continuous bath;* during the eruptive stage the patient was placed in the water and was attacked by pleuro-pneumonia, as the result of the pleuritis, empyema supervened after the lapse of a year. During the stadium floritionis a daily bath of four hours' duration is beneficial, the course of the disease being thereby shortened. In recent times the *Sarracenia purpurea* has been vaunted as a specific in variola; the chemical analysis of this drug gave the following result:—sulphate of carbon, phosphate of lime, potash, soda, iron, silicic acid, gum, starch, vegetable albumen, tannin, resin, and a bitter principle. The results of clinical observation are given differently; we have, however, no experience to offer on this subject.

Cicatrices of variola. The numerous remedies, which have been recommended with the object of preventing the formation of the scars and pigmentary stains on the face, which so frequently result from the variolous process, are unsuccessful, from the fact that the loss of substance can only be repaired by cicatricial tissue, and that an acute inflammatory condition of the skin, is usually associated with a deposit of pigment. The more deeply the pustules are seated, and the further the inflammatory process extends to the corium and subcutaneous areolar tissue, the greater is the probability of cicatricial formation. This condition occurs most frequently as the result of variola vera, for amongst 100 patients, 50 show the pitting of small-pox (Hebra); scars, however, may also be produced by the varioloid and varicella, if the inflammatory process has extended deeply. On the shedding of the crusts the cicatrices are of a reddish-brown tint, and somewhat raised above the surface of the skin; with the lapse of time they become pale, shrunken, and less disfiguring. We may also notice the fact that the cicatrices of variola, instead of diminishing in extent, frequently increase in breadth and thickness, in consequence of which they either produce disfigurations, or give rise to the painful tumours which we term "false keloid," the extension of which cannot be prevented by any remedial agent.

Although we are unable to prevent the formation of scars, yet we can adopt remedial measures to render them less disfiguring, as, for instance, by favouring the escape or coagulation of the pustular contents. This is accomplished by the above-mentioned means; the *Emplast. mercurial. de Vigo* alone, or in combination with the *Emplast. diachyl. simplicis cum Ol. lini*, are employed in order to macerate the variolous eruption and hasten the desiccation. The same object may be attained by poultices, but these cannot well be applied to the face. As before mentioned, painting with tincture of iodine also favours rapid desiccation. Corrosive sublimate, spirit of camphor, and zinc ointment, are of little use.

Variola verrucosa. Besides the scars which frequently remain throughout life as the effect of the variolous process, the affections of the hair-follicles and sebaceous glands, which occur soon after small-pox, producing disfigurement of the face, chiefly of the nose, merit special description. These morbid changes are due partly to the variolous crusts which cover and mechanically occlude the apertures of the follicle, partly to the implication of the glands themselves in the inflammatory process, and are identical with the secretory affections of the cutaneous glands, which are produced by other causes. The forms in which these changes appear are:

1, comedones; 2, acne pustulosa et indurata; 3, variola verrucosa (wart-like elevations, the centre of which shows the aperture of the follicle); 4, tumors (plug-shaped, soft, and pendant); 5, cicatrices (ridge-like streaks).

Comedones produced by prevented excretion present no differences from those due to other causes except that the accumulation of sebaceous masses is considerable, in consequence of which, on their removal the apertures appear widened and gaping.

On the shedding of the variolous crusts there occur more frequently wart-like eminences, which are pale-red at first, and later assume a dirty-brown colour, and in the centre of which one or several apertures of hair-follicles and glands are traceable. This efflorescence is known as *variola verrucosa*, and is dependent upon the simultaneous occurrence of an inflammatory process in the skin and an excessive secretion in the glands, whereby, on the removal of the variolous crusts, the follicle becomes distended in length and breadth, thus producing the elevations which enlarge during the first few days, then gradually become depressed, and finally disappear. The disfigurement of the face, which lasts for weeks and even months after small-pox, is chiefly due to this condition.

An inflammatory form of *seborrhœa* exceptionally occurs as a sequela of small-pox, leading to the formation of yellow crusts, which, if not removed artificially, remain adherent even for years, particularly on the nose. In other cases an *acne* efflorescence occurs, which usually becomes pustular; *lupus erythematodes* very rarely originates in this way. Other morbid conditions, which occur chiefly on the alæ of the nose, are the following:—reddened and plug-shaped tumours several lines in length, with broad pedicles, and somewhat resembling pointed condylomata. On removal of one of those growths, examination shows its capsule to consist externally of a thin epidermic and Malpighian layer; internally of young connective tissue, enclosing a space which contains dark-brown friable masses of sebum. These would appear to be special structures, which I regard as similar to those of *molluscum contagiosum*, apparently produced by the occlusion of the follicular aperture, in consequence of which the accumulating sebum by the *vis a tergo* protrudes the remaining portion of the wall of the follicle. This condition occurs only in severe cases, and produces considerable disfigurement of the nose. Lastly, extending over healed parts, there are ridge-like remains of skin, under which the probe can be introduced.

Treatment. The remedies which are useful in seborrhœa and acne are also employed with advantage in the similar conditions which we have described. The plug-shaped tumours and ridge-like cicatrices are to be removed by scissors, whereby the appearance of the skin is improved.

Vaccination. As is well-known, vaccination was introduced by Jenner in the year 1796, and has since been adopted in all civilized countries. Although not affording absolute protection against small-pox, vaccination at least modifies considerably the intensity of the disease, inasmuch as those who have been vaccinated are mostly attacked by varicella or the varioloid, and the non-vaccinated, by variola vera. In the latter also the mortality is greater (on the average 14 per cent.) than in the former (4 per cent.).

Vaccination is performed from arm-to-arm, from preserved lymph, or directly from the heifer. When we have a choice, the method from arm-to-arm is to be preferred, as the lymph thus obtained is fresh and abundant; the opportunity is also afforded for thoroughly examining the child from whom it has been taken. The other methods of vaccination are :—1. The application of a vesicant, cutting the blister thus produced, and rubbing in either the vaccine crust or pure lymph. 2. The use of the so-called vaccination-pen, which has been previously impregnated with lymph, and produces horizontal and vertical incisions in the skin. 3. The puncture of the skin by means of the vaccination-needle, which has been previously dipped in lymph. 4. The lymph being first placed upon the skin, the part is scratched with the needle. The last method is to be preferred, as it causes the least pain and the smallest wound. We vaccinate at the same time both arms, making three punctures on each, and were only one vaccine pustule produced, the object of the process would be accomplished. On the fourth day after the operation a papule is observed, which becomes a vesicle on the fifth or sixth, and increases until the eighth, when it contains a small quantity of pus.* The development of the pustule continues until the ninth day, when it dries up and becomes converted into a scab, which adheres until the end of the third week. The pure vaccine matter can only be obtained on the eighth day. The phenomena which occur on the skin as complications of vaccination are the following:—1. *Erysipelas vaccina* usually occurs between the seventh and tenth day, is at first limited to the vicinity of the pustule, and sometimes extends rapidly over the entire extremity or even to the trunk; exceptionally, however, this affection may appear first at distant parts of the integument, as, for instance, on the lower extremities. As soon as the extension of erysipelas is observed, deep incisions must be made, and the contents of the pustules allowed to escape, as by these measures the further progress of the disease is best prevented. 2. *Vaccinola.* Simultaneously with the eruption at the site of the vaccination, vesicles on other parts of the skin may occur, the contents of which consist of a gummy fluid, which, when inoculated, produces varicella or varioloid in other individuals. 3. *Roseola vaccina* is a diffused reddening of the skin, which occurs during the course of the vaccinal process. 4. *Variola vaccina atrophica* (*Steinpocke*) in which, instead of pustules, vesicles or bullæ occur, which rapidly desiccate. 5. *Eczema vaccina.* Around the vaccinated parts are formed several varieties of vesicular eruption, which produce violent itching, and occur especially in emaciated and strumous subjects. Besides these phenomena there are sometimes observed, as the results of vaccination, boils, abscesses, and gangrene on the parts at which the lymph has been introduced.

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* In regard to the elements of vaccine lymph many observers have instituted important researches, and those of Keber, of Dantzig (Wir. Arch. 42), are especially worthy of notice. Keber found that in vaccine, as also in variola lymph, peculiar organic bodies normally exist, and that a very active cell-growth takes place. Even clear vaccine lymph contains pus and blood-corpuscles as well as remains of epidermis. The lymph coagulates after a time, and this coagulum takes very well even after it has been kept for a long period. It contains nuclear cells (from 1-150 to 1-300‴ in diam), free nuclei, and extremely minute molecules. The nuclei undergo division into minute particles, which adhere to one another in groups of 2, 4, or 6; these cell-structures are the special vehicles of the vaccinal poison. In old lymph crystals are separated. He found the same elements in variolous lymph, and in the blood of those affected with

In children there is usually slight febrile disturbance and restlessness between the seventh and ninth day, which, however, does not contra-indicate early vaccination; a child may safely be vaccinated fourteen days after birth, and the season of the year is immaterial. The transferrence of several forms of skin disease by vaccination is rather suspected than proved; and this applies also to struma, tuberculosis, and other constitutional taints.

In regard to the inoculation of *syphilis* by vaccine matter, in support of which so many cases have been adduced, especially during the last ten years, we cannot from our own experience record any such instances; we may however direct attention to the

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small-pox. That these bodies do not arise from decay, is proved by the fact that the only vaccine lymph which retains its activity is that in which the cell-growth has not been destroyed by chemical decomposition.

Hallier concluded from the micrococcus of vaccine lymph, the existence of various substrata (*penicillum*, *aspergillus*, and *mucor*).

following experimental results:—When we inoculate with matter consisting of equal parts of the pus from a chancre and of vaccine lymph, we observe on the eighth day a depression of the pustular capsule, on the removal of which an ulcer is disclosed, which has the character of a soft chancre; the peculiar aspect of such an ulcer will readily be recognised, and inoculation from it avoided. When a healthy individual is inoculated with lymph *mixed with blood* from a syphilitic subject, an infiltration is developed in place of the vaccine pustule, which presents exactly the character of an indurated sore; if, however, *pure lymph* without admixture of blood be taken, a pustule will be formed which in most cases presents no syphilitic phenomena. Hence it is prescribed by law that vaccination be performed with pure lymph without any admixture of blood.

The curative treatment of syphilis by transferrence of vaccine lymph consists, according to Jelschinski, in the inoculation ofa syphilitic subject with a quantity of vaccine matter on twenty different parts during short periods, which, according to this author, uniformly "takes," and removes the syphilitic symptoms. Although the possibility of successful vaccination within such short periods was *à priori* scarcely conceivable, and opposed to all experience regarding immunity, remembering that in a hundred individuals re-vaccinated when twenty years of age, it was unsuccessful in forty, we nevertheless inoculated an individual (affected with papular syphilis) at twenty points, of which sixteen took, whilst repeated inoculations with fresh lymph after several weeks failed. We soon had an opportunity of studying the influence of a more intense but similar contagion,—namely, that of variola,—on syphilis, and we arrived at the following conclusions:—Syphilitic eruptions of the macular, papular, and squamous varieties disappear during the variolous process, as in all specific fevers. Syphilitic ulcers become unclean and covered with a thick yellow exudation; around and upon the broad condylomata variolous pustules accumulate in great numbers. When the variolous process has exhausted itself, the former symptoms of syphilis re-appear, but in a milder form, due to the period of time which has elapsed, and during which the syphilitic virus has lost some of its intensity. If, therefore, the influence of variola on syphilis be so small, that of the vaccine matter (a milder virus) will be still less. In addition, we may remark that true small-pox shows a tendency to become confluent on parts where either an acute or chronic inflammatory process exists; thus a severe form of confluent variola is frequently associated with eczema, and if the former affection extend over the entire body, the life of such patients is endangered when they are attacked by small-pox. We also find an accumulation of variolous pustules on parts at which psoriasis, scabies, or other chronic skin diseases exist. Those affected with ichthyosis and prurigo are often freed from those affections when attacked by variola vera.

2. MEASLES (*Morbilli, Rubeola, Rougeole*).

The disease termed measles is characterized by an eruption of maculæ or papulæ, distinctly separated, and scattered over the entire surface of the skin. It is accompanied by fever and by a catarrhal affection of the respiratory mucous membrane; it usually runs an acute and typical course, and is contagious.

Pathogenesis and Etiology. In regard to the origin of the disease we are entirely ignorant; the fact, however, may be considered as well established that measles never arises except as the result of infection, although this is not always traceable. The vehicle of infection—the contagion of measles—has not yet been demonstrated by chemical or microscopical investigation, nor have we any knowledge of its nature, whether it be an organic or inorganic substance, the fungus theory being still doubtful. The contagion is transmitted by the secretions of the respiratory tract, the lachrymal secretion and the blood; inoculations made on healthy subjects with these fluids have been followed by an eruption of measles. The infecting principle would appear to be conveyed also by the exhalations of the skin and lungs, as susceptible individuals may become infected even by the mere vicinity of patients suffering from measles. The duration of the period of incubation varies between twelve and fourteen days, and appears to be even longer when the infected person is suffering from another disease. According to experience, the infection of measles is most powerful during the exanthematic period; and there are many cases to prove infection during the premonitory stage, but during desquamation it certainly does not take place.

The susceptibility to measles exists in every one; a single attack, however, usually confers immunity for the rest of life. In consequence of the frequency of epidemics of measles in populous districts, most people are infected during childhood; and only in this sense can we regard the disease as peculiar to children, for in districts isolated from traffic, and therefore rarely visited by measles, the susceptibility of children is not greater than that of adults. The epidemic observed by Panum amongst the inhabitants of the unfrequented Faröe islands was the first which had appeared for sixty-five years, and therefore nearly every one who had not reached that age, or who had not gone through the disease abroad, was attacked, young and old indiscriminately.

In epidemics of measles, children during the first year of life and very old people are rarely attacked. Acute and chronic diseases afford no protection against measles; and this applies also to pregnancy and the puerperal state; we observe, however, that the eruption appears only after the acute disease (during which infection took place) has run its course. The extent of epidemics of measles depends chiefly upon the length of time since the last outbreak, and upon the number of individuals who have hitherto escaped the disease. Minor epidemics of measles occur about every three or four years; more extensive ones at intervals of eight or ten years. The inhabitants of populous towns are proportionately more exposed to the disease than the rural population. The duration of an epidemic stands in inverse ratio with its severity, and the latter with the frequency of its occurrence; the shorter the epidemic, the more severe; and the more frequent the occurrence, the milder is its course.

The so-called *character* of the epidemic depends not upon any specific malignant or benign quality of the contagious principle, but chiefly upon a number of collateral circumstances, among which are the weather, the season of the year, the nature of the other diseases which are prevalent at the time, or have recently been epidemic. Thus the septic or asthenic character of measles is to be explained, and the influences which we have enumerated, as well as the condition of individual patients, produce the anomalies or complications in the course of the disease. The complaints which have been most frequently observed as precursors of an epidemic of measles, are inflammatory affections of the respiratory organs, as also hooping-cough.

Morbid Anatomy. In fatal cases of the ordinary form of the disease there are no pathological changes observable; if, however, the eruption has been accompanied by hæmorrhage in the tissue of the cutis, this is seen after death. The mucous membrane of the respiratory tract exhibits the morbid changes of catarrhal inflammation, which, however, are not distinguishable from those of an ordinary catarrh. The pathological changes in the skin during life consists in the appearance of numerous red maculæ of the size of a millet-seed, which soon become slightly elevated, forming minute papules. These either coalesce at several parts and form irregular crescentic patches, or remain separate, the intervening cutis being of the normal colour. There is usually œdematous swelling of the face. According to G. Simon, the papules are formed by the accumulation of small masses of inflammatory exudation at circumscribed parts, especially on those at which the skin is penetrated by the hairs. The blood is deficient in fibrine, usually fluid, and of a dark tint; it is frequently also thick, like tar. The complications to which in most cases the fatal result is due, leave their characteristic pathological changes.

Symptoms and Course. After the period of incubation, during which there are no signs of infection, the premonitory stage sets in.

1. *Stadium prodromorum.* The symptoms observed during this period are—alternating sensations of cold and heat, prostration, pain in the joints, headache, and dryness of the skin. These febrile symptoms, which are most intense in the evening, present, however, no diagnostic indications of the impending disease. The occurrence of a catarrhal inflammation of the nasal mucous membrane, which extends to the conjunctiva as well as to the larynx and trachea, is more characteristic. This condition explains the frequent sneezing, the increased discharge of mucus from the nose, and consequent obstruction to the passage of air; there is sometimes also epistaxis. The eyes are inflamed and intolerant of light; there is profuse lachrymation, and aching pain over the forehead and eyebrows. The voice is hoarse, the cough rough and barking, and the signs are those of threatening laryngitis and croup. This stage lasts usually from three to five days, in many cases even longer, during which time the symptoms vary in severity, but seldom increase to such an extent as to endanger life.

2. *Stadium eruptionis.* This stage commences with an exacerbation of fever. The temperature of the body is raised, the pulse becomes more and more rapid, and there are sometimes attacks of convulsions. The eruption appears first on the face, around the eyes and mouth, and spreads gradually over the entire body. The minute red points which are raised above the surface are often to be detected by the touch rather than the sight, and are scarcely distinguishable from a commencing eruption of variola; even at this period, however, the dark-red, irregular, and rarely round

spots on the soft palate, which are characteristic of measles, can be recognised. Within twenty-four hours the maculæ and papules become considerably larger and of darker tint, are distributed over the entire body, and are now easily recognised as the eruption of measles. There are cases, however, in which the eruption requires a longer time for its complete development, or is distributed on limited parts, whilst others are but slightly affected; and lastly, the eruption may be entirely absent (*morbilli sine exanthemata*). The constitutional disturbance and febrile and catarrhal symptoms become more intense with the appearance of the eruption, and reach their maximum with its complete development. In epidemics of malignant character the danger to life from these symptoms is greater during this than during the premonitory stage, as the temperature may attain an excessive height; in such cases the fatal termination is ushered in by general paralysis (morbilli of *asthenic* or *nervous* character, and if hæmorrhage in the cutis occur, of *septic* character). Happily such malignant epidemics are of rare occurrence, and in most cases the stadium eruptionis is easily passed.

3. *Studium florescentiæ.* When the greater part of the efflorescence has been developed, the stadium florescentiæ commences. The exanthem attains its greatest development, and remains stationary for about twenty-four hours, from which time it begins to subside. The febrile symptoms decrease or entirely cease; the catarrhal affections still continue, although considerably modified. The intolerance of light is less, the secretion of the nasal mucous membrane is diminished and more viscid, sneezing is less frequent, hoarseness decreases, the cough is less violent, and the patients (who do not swallow the sputum) expectorate thick purulent masses (*sputa cocta*). The efflorescence fades or entirely disappears on the third or fourth day from its first appearance, its site being usually indicated for a short time by a yellow stain. In most cases the disease thus runs its normal course without important modifications; and if this applies also to the premonitory and eruptive stages we speak of—*Morbilli vulgares, simplices*, or *erithici.* The course of the inflammatory or synochal form of measles, however, is different and much more acute; in such cases the maculæ (which are mostly confluent, and the appearance of which has been ushered in with violent symptoms) do not fade after twenty-four hours, but rather become darker, and remain visible on the skin for several days. These maculæ frequently assume a blue or violet tint; and as they do not disappear beneath

the pressure of the finger, we must regard this condition as the result of a partial rupture of the distended capillaries of the skin, like similar hæmorrhages caused by other inflammatory affections. In these cases there is augmented action of the heart, and a full and strong pulse. The catarrhal affections of the mucous membrane are more severe and extensive in this form of measles, or the inflammation is croupous and frequently spreads even to the lungs; catarrhal affections of the gastric and intestinal mucous membranes also occur. If, during this stage, pertussis and the dyspnœa characteristic of laryngitis sets in, we may expect an unfavorable development of the disease. The dyspnœa increases, the breathing is insufficient, and collapse takes place. This form of morbilli is frequently complicated with lobar and lobular pneumonia, which is indicated by an exacerbation of the febrile symptoms, hurried respiration, and by pain in the side if the pleura be also involved in the inflammatory process. The excessive increase of these symptoms soon leads to general collapse, and the exanthem suddenly disappears. The "going-in of the eruption," which is popularly, and in this case justly, regarded with fear, is not, however, the cause, but rather the result of the acute internal disease. In lobar pneumonia the consolidation of the lung may be ascertained by physical examination. Although most of these cases are protracted in their course, recovery takes place in the usual manner. The symptoms which arise from complications gradually disappear, and the disease passes into the stage of desquamation.

Besides the *synochal* form, there are also *asthenic*, *nervous*, *torpid*, and *septic* morbilli (these, however, are more correctly described as measles with *typhoid* course), which also may be accompanied by lobar pneumonia, and in which the temperature of the body attains an abnormal height, and the action of the heart, although primarily augmented, becomes weakened and paralyzed. In these cases the exanthem is pale-red, and, when accompanied by hæmorrhage in the cutis, of a blue-violet colour; there are also, sometimes, petechiæ observable between the morbillous maculæ, which indicate a morbid condition of the cutaneous capillaries, and this is also shown by profuse epistaxis. In this form of the disease the majority of children who have passed the earlier stages die, the symptoms being those of severe collapse or coma, with small and very rapid pulse.

4. *Stadium desquamationis.* In ordinary cases this stage commences eight or nine days after the stadium florescentiæ. At this period the morbillous maculæ have entirely disappeared, and the seat of the eruption is indicated by a desquamation of the epi-

dermis, which is more distinctly observable on exposed than on covered parts of the body. The febrile symptoms have entirely ceased, and the catarrhal affections gradually decline. Although complications occur less frequently during this than the other stages of the disease, still it is not entirely exempted; thus croupous laryngitis may interrupt the ordinary course of the disease, and endanger the life of the patient. In very rare cases also the face or pudenda is attacked by gangrene. In addition to lobar and lobular pneumonia and croupous inflammation of the mucous membranes, there arise also other complications of measles, as *diphtheritis*, *scorbutus*, *pertussis*, *tuberculosis*, and *gangrene of the lung*. As frequent sequelæ of measles, may be enumerated:—*phthisis*, and a number of strumous affections, as *ophthalmia*, *ozæna catarrhalis*, *otorrhœa*, *glandular swellings*, *chronic inflammation of the periosteum and joints*.

Treatment. As nearly everyone must undergo this disease, prophylactic measures, as the separation of healthy children from those who are infected or suffering from measles, are advisable only during the prevalence of malignant epidemics. And further, as there is no remedy which can ensure a favourable issue of the disease, it is well to avoid giving medicines in simple cases, and to limit the treatment to a regulation of the regimen. The physician should see that the temperature of the sick-room be kept at about 66° F., and that fresh air be admitted daily. The patient may be washed with tepid water, and the linen changed, taking care, however, not too long to expose the body; the linen must also be thoroughly dried and aired. The room must be darkened according to the degree of ophthalmia. Whilst the fever continues the patient may be allowed clear soup and bread, and, if there be constipation, cooked fruit; on the cessation of fever, broth and milk diet, gradually giving more nutritious food. The patient ought to be confined to the room as long as the desquamative stage and cough continue. The practice of inducing the re-appearance of the exanthem (which has "retroceded") is irrational and injurious. The treatment of the complications must be only directed against them without being in the least modified by the existing exanthem. In the typhoid forms of the disease, and in cases complicated with lobar and lobular pneumonia when there is a high degree of fever, quinine from 4 to 8 gr. p. d., according to the age of the child, is to be employed.

3. SCARLATINA (Scarlet Fever.)

Scarlatina is an acute, contagious disease, which is characterised by a scarlet rash covering the greater part, or the entire surface of the body, and is attended with fever and an inflammatory condition of the organs of deglutition.

Pathogenesis and Etiology. In nearly every case scarlatina is traceable to infection, but we cannot absolutely assert that it never arises spontaneously. The infecting principle of scarlatina is as obscure as that of measles; it would appear to be contained in the exhalations of the patient, and imparted to the surrounding atmosphere, as susceptible individuals may become infected by the mere vicinity of the patient, and contagion may be transmitted by persons who do not themselves take the disease. As the exact time of infection is uncertain, the period of incubation cannot accurately be determined; it would appear, however, to be shorter than in measles, and to extend to about eight days. The susceptibility to scarlatina is not so general as that to measles, and one attack affords immunity for the rest of life. Children over two years of age are the most liable to infection, but adults, and even very old people, may also be attacked by this disease. In large towns scarlatina is scarcely ever absent, as sporadic cases constantly occur. The causes which determine the occurrence of epidemics are unknown, but would appear to be dependant upon climatic and telluric conditions.

Morbid Anatomy. The skin presents during life the phenomena of a general and intense hyperæmia, and of an inflammatory œdema of the superficial layers of the cutis. The rash appears first in the form of numerous minute points, which coalesce and produce a uniform reddening of the entire surface (*scarlatina lævigata*). In *scarlatina variegata* the rash occurs in the form of separate, irregular, and usually dark-red patches on the pale-red skin. There arise small papules when the inflammatory exudation is accumulated on circumscribed parts (*s. papulosa*). The epidermis is frequently covered with numerous small vesicles (*s. miliaris, s. vesicularis*), or with large bullæ filled with clear or turbid yellow-coloured fluid (*s. pemphigoidea, s. pustulosa*). Petechiæ and extensive ecchymoses are observed only in malignant cases. The pathological changes which are observed in fatal cases of scarlatina are mostly caused by the diseases which arise as complications or sequelæ. The blood is usually dark, thin, and deficient in fibrine; the spleen and intestinal glands are frequently congested.

E. Wagner (Archiv für Heilkunde) found lymphatic growths, especially in the liver, spleen, kidneys, and small intestines; those in the liver in the form of white nuclei, visible to the naked eye; in one case the liver was enlarged by one-half of its size.

Symptoms and Course. The ordinary forms of scarlatina present only an exanthem, severe angina, and simple hyperæmia of the kidneys. In most cases the general health of the infected person is undisturbed during the period of incubation; in some cases, however, there is malaise, prostration, and an indefinite feeling of illness. The premonitory stage sets in with febrile symptoms; alternating sensations of heat and cold, an accelerated pulse (even to 140), and an elevated temperature of the body (102° F.). The other symptoms are, feelings of weight in the head, giddiness or severe headache, nausea or even vomiting, a reddened and swollen state of the tonsils and soft palate, which extends also in a less degree to the tongue and throat. In scarlatina, as in measles, reddening of the soft palate is early observed even before the occurrence of the angina, and is distinguished from that of measles by being more or less punctated and not macular. The patient complains of sensations of dryness and burning in the throat, and of pain, which is increased on swallowing. In children, the most frequent symptoms are, general depression, somnolence, delirium, and convulsions; this stage, however, lasts sometimes only a few hours, usually from one to three days, but may be entirely absent in cases in which the eruption appears simultaneously with the symptoms which have been described.

The occurrence and the intensity of the premonitory symptoms are dependent partly upon the constitution of the patient and partly upon unknown influences; and there are cases in which these symptoms are very slight, and the patient has scarcely the sensation of a severe illness.

The febrile and other symptoms become more intense with the commencement of the *stadium eruptionis.* The rash appears in the form of minute and closely-aggregated red points, at first on the neck, from which it spreads to the chest and the rest of the body. The face usually remains free from the eruption, excepting that the rosy hue of the cheeks is increased by the fever and congestion. The angina becomes more and more severe, and the redness of the pharyngeal mucous membrane more intense; the tongue, which at an earlier period was covered with white fur, assumes a dark raspberry tint, its surface being rough from the enlarged and projecting papillæ. The further course of the disease is not materially influenced by variations in the symptoms which we have described, as, for instance, by an unusual rapidity in the spread of the eruption, greater or less intensity of redness, or of the anginous condition. Catarrhal affections of the larynx, trachea, and bronchi, not rarely occur as complications.

In the *stadium floritionis* the febrile symptoms increase until the second day, when they usually attain their acme, and the exanthem its full development; at the same time, also, the angina reaches its maximum. The general health of the patient is materially impaired; in the urine there is a large quantity of epithelial cells, and frequently traces of albumen. The morbid phenomena gradually subside, the pulse becomes less frequent, the eruption fades in the order of its appearance, and after three or four days is indicated only by a brownish pigmentation. The inflammatory condition of the mucous membrane of the organs of deglutition also gradually declines. This stage usually lasts six days, when the *stadium desquamationis* commences.

During the decline of the symptoms described, desquamation takes place in the order of the appearance of the rash, commencing on the neck with the shedding of the epidermis, in the form of fine lamellæ. According to the intensity of the eruption the epidermis is shed on other parts, as on the extremities, either in large lamellæ (desquamatio membranacea), or in small scales (desquamatio furfuracea). This stage lasts from eight to fourteen days, during which the remaining traces of fever and angina disappear, and in favorable cases is followed by complete recovery.

Such is the usual course of scarlatina in the milder epidemics and in sporadic cases; deviations in the course, and complications with other diseases, however, occur more frequently in scarlatina than in either measles or small-pox.

In regard to the exanthem, we have already described the various forms which it may assume; in some cases, however, it may be entirely absent, and we then speak of *scarlatina sine exanthemata,* which is distinguished from simple angina only by the high degree of fever and consequent disturbance of the general health; and the diagnosis of scarlatina is confirmed if these symptoms occur during an epidemic of that disease. We are also assisted by the latter consideration in the diagnosis of *scarlatina sine angina,* and in the distinction of this affection from a general erythema, or from several forms of roseola. In the course of scarlatina, certain of the symptoms described may attain such a degree as to render the general phenomena of the disease of minor importance. As in measles, so also in scarlatina, the fever may assume a malignant character, and in such cases the patients die in consequence of blood-poisoning from paralysis of the heart, with symptoms of extreme prostration. It is still doubtful whether the effect on the nervous system, and especially on the nerves of the heart, is the result of the scarlatinal blood-poison or of the excessive temperature of the body. The symptoms of this malignant form of scarlatina resemble those of the asthenic and typhoid forms of measles, or of other acute inflammatory and contagious diseases. The patients are extremely prostrate, apathetic, and comatose. The pulse is extremely feeble and scarcely perceptible; the tongue dry and covered with sordes; the trunk frequently hot and the extremities cold; the pupils dilated; there are frequent rigors or general convulsions; œdema of the lungs frequently supervenes, and the patients die with the symptoms of extreme collapse. In these cases, if the patient survive the premonitory stage, the rash appears usually very slowly and irregularly, is of pale-red or livid hue, and frequently accompanied with petechiæ, which remain after its disappearance. The eruption produces no change in the general condition of the patient; most cases terminate fatally at this stage, and those protracted to that of desquamation usually succumb to the sequelæ of the disease.

The symptoms of *parenchymatous inflammation of the tonsils* frequently become so intense as to constitute an independent disease, and endanger the life of the patient. This affection may either precede or accompany the first appearance of the rash, or more rarely arise during the stadium floritionis; it causes considerable difficulty in swallowing and thickness of speech; both tonsils are usually attacked, and the enlargement is frequently so great that they become approximated, leaving only a narrow chink between them. The parts around the tonsils are also involved in the morbid process. The disease, which reaches its height in from two to three days, produces a determination of blood to the head, exacerbation of fever, a swollen condition of the face, and extreme restlessness, terminates in suppuration, or, in severe cases, in gangrene. The pus, which is usually discharged by several openings, is, in the case of children, mostly swallowed. Permanent enlargement of the tonsils frequently remains. The gangrene, which begins at circumscribed parts, or with the formation of a gangrenous bleb, is earlier recognised, especially in the case of children, by the fœtid odour, than by the eye; it soon spreads to the neighbouring parts, and the fatal termination is ushered in with increased rapidity of the pulse, hurried respiration, cold extremities, suppression of urine, and constipation. The existence of suppuration or gangrene, if not accompanied with such results, does not exert any marked influence on the exanthem. *Diphtheritic inflammation of the tonsils* and their vicinity exists as a complication in some epidemics; in its first stage this does not present a threatening aspect; the difficulty in swallowing is not very marked, the nares and fauces are nearly always involved; there is a discharge from the nares, which at first has the appearance of a normal secretion, but this is soon followed by a yellow offensive fluid, which corrodes the parts over which it flows. On examination of the mouth and fauces, we observe ash-coloured patches of exudation adherent to the infiltrated and reddened mucous membrane, which are soon thrown off in the form of crusts, leaving unsightly ulcers. The cervical glands on both sides are swollen. The patient lies in a comatose condition, the pulse is small and rapid, and the temperature elevated to 102° or 105° F. Laryngitis, which is indicated more by hoarseness than by cough, sometimes arises as a complication, and accelerates the fatal termination; this affection does not modify the exanthem. If the patient survive this stage, the ulcers heal very slowly, especially those at the angles of the mouth. The inflammatory process sometimes extends by the Eustachian tube to the cavity of the tympanum, producing internal otitis, which may lead to perforation of the tympanum and caries of the petrous portion of the bone, as the result of which the patients suffer for a long time from otorrhœa, and more or less deafness during the rest of life.

Inflammation of the areolar tissue of the neck and of the submaxillary glands, is a dangerous complication during or soon after the stadium florescentiæ, and may be compared to the metastatic phenomena of typhoid fever. On one or both sides of the neck a painful tumor is formed at the angle of the jaw, which is characterized rather by its hardness, than by heat and redness of the skin; it rapidly enlarges, and terminates rarely in resolution, more frequently in suppuration and gangrene. If an abscess be formed, it is in most cases discharged spontaneously at the deepest part, and unless an artificial opening be made, the pus may burrow more deeply. At a later stage gangrene occurs, or it may arise primarily as a gangrenous bleb, from which it extends rapidly and destroys all the soft parts, and the case terminates fatally from the complications which supervene, or from phthisis. This affection is analogous to the *noma* or gangrene of the vulva, which occurs as one of the sequelæ of measles.

The scope of this work does not permit of a detailed account of the further complications and sequelæ of scarlatina, and we shall therefore simply enumerate them. Croupous nephritis and inflammations of the serous and synovial membranes, are frequent complications. The following are the sequelæ which are due to changes during the course of scarlatina: ozœna, affections of the organ of hearing, enlargement and suppuration of the tonsils, especially in strumous subjects. The most frequent of the sequelæ, however, is scarlatinal dropsy, the origin of which is still obscure; it is probably dependent upon a localisation of the scarlatinal process in the kidneys; it occurs with or without albuminuria, affects chiefly the subcutaneous cellular tissue, but may also extend to other parts, as well as the serous cavities.

Treatment. In former times many remedies were recommended as prophylactics in scarlatina, which soon, however, proved useless; even belladonna, which is so much esteemed by homœopathists, does not afford any protection against the contagion of scarlatina; the most effectual prophylaxis of this disease, therefore, consists in isolating the patients, especially in malignant epidemics. In regard to the treatment, we are to be guided by the same principles as in measles. The temperature of the sick-room should be uniform, not exceeding 60° F.; it must be properly aired, and the patient carefully washed. The patient should drink fresh water or lemonade, and his diet should at first consist of clear soup with bread, and later of milk and meat broth. The patient should not leave his bed during the stage of desquamation, and keep his room for about a fortnight afterwards, especially during winter. Under such treatment, recovery takes place in favorable cases without the administration of medicine. In cases of the malignant type—especially when associated with intense febrile symptoms and high temperature—the hydropathists employ repeated "packings" in cold wet sheets. Threatening paralysis ought to be temporarily warded off by the administration of powerful remedies, as carbonate of ammonia, camphor, and musk. Diphtheritic ulcers may be touched with nitrate of silver, or painted with a solution of equal parts of liquor ferri sesquichloridi and water. Lime water may be employed as a gargle, as has recently been recommended, or, where this is inapplicable, it may be given internally, with the addition of syr. rub. idæi. (ʒss. every half-hour). This solution may be used in the form of spray in coryza diphtheritica; painting the parts in any way has been almost entirely given up by experienced practitioners. In coryza a weak solution of nitrate of silver may be injected into the nostrils.

b. *Inflammatory affections arising from infection by animal poisons.*

1. MALIGNANT PUSTULE *(Milzbrand-Karbunkel).*

This disease is caused by the direct transference of putrid animal matters by contact, and occurs most frequently in butchers, flayers, shepherds, etc., or is indirectly transmitted by the agency of stinging flies. It originates as a minute livid-red spot, which, however, rapidly developes into a hard papule, on the summit of which a small pustule arises. This pustule bursts, and with progressive increase of the infiltration, accompanied with violent pain and severe typhoid symptoms, the part becomes gangrenous; there is considerable œdema of the adjacent tissues, followed by rapid destruction of the soft parts, extending to the bones. In most cases death ensues in two or three days. The affection most frequently takes its origin on exposed parts of the body, as the hands, forearms, and face.

Treatment. As long as the morbid process is limited to a small portion of the skin, the infiltration may be burnt out by the actual cautery, or by caustic potash, as the destruction of the poison affords the only chance of saving the patient's life. When the infected part is favorably situated for the use of the knife, excision is the surest method.

2. NICROGENIC PUSTULE (*Infection by cadaveric poison*).

There are several severe forms of disease arising from infection by the poisons of dead bodies, occurring especially in anatomists, post-mortem room assistants, and butchers. The infection may take place either through wounds or apparently normal portions of the skin; in the latter case, the poison may have remained in one of the follicles. The inflammatory process commences locally, extending soon to the lymphatic vessels and glands, and diffused suppuration of the skin and lymphatic glands takes place, accompanied with severe febrile symptoms. As the infection usually extends from the hand, the upper extremity is most frequently attacked by lymphangioitis and pseudo-erysipelas; suppuration of the axillary glands usually takes place. The morbid process may then remain limited, or suppurative pleuro-pneumonia, or general purulent infection of the blood (pyæmia) supervenes, which proves fatal. The so-called dissection-wart (*callus*) is more frequently developed at the seat of the infection as a circumscribed inflammatory process, resembling an acne pustule or furunculoid infiltration, which remains as a red and painful tumor, gradually increasing in consistence. The surface of the tumor becomes slightly ulcerated, appears fissured, and is covered with a moderately thick, purulent crust; it is only in rare cases that such a callus heals spontaneously.

Treatment. In handling dead bodies, wounded parts must be carefully protected by adhesive plaster; wounds made during the dissection must be scrupulously washed and allowed to bleed freely; and when it is suspected that the subjects have died from pyæmia and puerperal fever, wounds should be treated with a caustic solution (acetic acid or caustic potash). The lymphangioitis is best treated according to the ordinary principles of surgery, by rest of the involved part, inunction of ointment, and the application of ice. The dissection-wart sometimes disappears from the continuous treatment by a macerating plaster; the surest method of removal, however, is the application of solid nitrate of silver.

3. GLANDERS (*Maliasmus, Rotzkrankheit*).

This affection arises from contact with the poison, especially of horses infected with glanders, but also from breathing air pervaded with the glander poison, as, for instance, in stables. The symptoms are, a severe degree of fever and rheumatic pain in the joints, accompanied by the formation of papular infiltration on the skin and on the mucous membranes, especially of the respiratory tract. From the infiltrated parts rapid ulceration of the tissues proceeds, and the vicinity of the ulcers becomes involved in erysipelatous inflammation. There is usually recurrence of these swellings, especially on the face, repeated ulceration sometimes involving the larynx and several lymphatic glands, and suppuration of large portions of the skin, extending even to the bones, and destruction of the nose. The symptoms of pyæmia ensue, leading to purulent infiltrations in the internal organs, as the lungs, liver, kidneys, etc., as well as in the joints, and the case terminates fatally.

The *treatment* is especially prophylactic; after infection, recovery takes place only in rare cases, which run a chronic course.

The inflammatory conditions produced by the bites of poisonous snakes and the stings of insects, scorpions, etc., belong to the same category.

c. *Diphtheritic Inflammation.*

On all parts of the skin denuded of epidermis, as excoriations, wounds, ulcers, and open pustules, a peculiar destructive process may take its origin; and it is highly probable that in every case infection from without is the cause of such morbid conditions, and it may be that special vegetable parasites constitute the infecting agent.

The disease appears almost exclusively during the prevalence of erysipelas, furunculosis, and phlegmonous inflammation, and where diphtheritic condition also exists, on various mucous membranes (conjunctiva, palate, pharynx, and female genitals). The parts denuded of epidermis become covered by a greyish-yellow membranous pellicle, adherent to the subjacent parts, which becomes permeated by serous exudation, and thrown off in fœtid shreds. At the same time minute vesicles appear, which rapidly burst, leaving irregularly serrated and hollow ulcers, with new formation of diphtheritic membrane. The tissues thus become changed into an offensive and discoloured pulp, and, within a short period considerable losses of substance result. The diphtheritic process either becomes spontaneously limited, or extends, and causes death by prostration or pyæmia.

Treatment. As soon as the diphtheritic pellicle is observed, caustics are to be applied, and the best are: liquor ferr. sesquichlorat. and water aa, Aq. vulneraria Thedenii Creosote, acid carbolic, gr. x. to 2 dr., lard, etc. The extension of the morbid process is only prevented with certainty by the destruction of the diphtheritic membrane.

B. NON-CONTAGIOUS INFLAMMATORY AFFECTIONS.

a. *Erythematous.*

The general character of erythematous affections is an inflammatory condition of circumscribed or diffused portions of the skin, involving the superficial layer of the corium or papillary body, and only exceptionally the entire thickness of the cutis. If vesicles and blebs arise, the loss of substance is repaired without the formation of cicatrices.

1. ERYTHEMA.

This group of inflammatory affections is termed by Hebra *erythema exudativum*, in contra-distinction to the erythemata regarded as hyperæmiæ. According to the several forms, he enumerates:

erythema papulatum, e. tuberculatum, e. iris, e. gyratum, e. annulare, and e. diffusum, which terms simply indicate different stages in the development of one and the same disease; whilst e. urticans, e. nodosum, and e. intertrigo, are to be distinguished from the other forms of the disease.

The term *erythema* is applied to inflammation of the skin, presenting itself in the form of macules, papules, and tubercles, the characteristic phenomena of which are redness, slight burning pain, serous infiltration, and short duration. The absence of itching is one of the most important clinical points in the diagnosis.

a. *Erythema papulatum* is the most frequent form of this disease, and occurs especially on the dorsal surfaces of the hand and feet, other parts of the extremities, as well as on the trunk, in the form of papules (of the size of a pin's head), which are surrounded by a red areola. The affection appears mostly during spring and autumn, especially in children and young people under twenty years of age, often occurring repeatedly in the same individual at a particular season, simultaneously with the prevalence of *herpes* (which is only a further development of this disease) and of *purpura simplex*. The peripheral reddening fades a few days after the appearance of the eruption, and only on the central papule a minute crust or thin scale remains. Erythema disappears spontaneously without leaving any pigmentary deposit, and produces no inconvenience except a slight sensation of burning. Infants and young children are more liable to repeated attacks than adults, the disease may, therefore, easily be confounded with prurigo ; the points of distinction, however, are the following:—1. Prurigo occurs on the extensor surfaces of the extremities, the flexor surfaces of the elbows and knee joints remaining free, even when the disease is severe. Erythema, on the other hand, involves also the flexor surfaces. 2. In severe cases of prurigo only, the trunk is attacked ; whilst erythema may primarily appear on that situation. 3. In prurigo there is severe itching, but not in erythema. 4. After prurigo has lasted some time, there remain pigmentary deposits ; this is not the case in erythema.

In many cases, a single examination is insufficient for establishing the diagnosis ; and definite conclusions regarding the nature of the disease, are arrived at only by repeated observation.

b. *Erythema annulare* arises from the extension of the peripheral redness, whilst the central elevation becomes flattened and pale, a crescentic appearance being thus produced.

c. *Erythema iris*, so-called from the varied colouring of the effloresccence, arises from the repeated occurrence of exudation in the periphery of an existing efflorescence, on the gradual disappearance of which, according to the duration of the eruption, various shades of colouring are left.

d. *Erythema gyratum* and *marginatum* arise from the confluence of several erythematous groups, the centre fading whilst the periphery remains in the form of red and curved lines.

e. *Erythema intertrigo.* From prolonged contact or friction of two opposed cutaneous surfaces, favored by high temperature and the presence of decaying excretions (sweat, urine), reddening and inflammation of the skin, accompanied with the formation of vesicles and blebs, and even ulceration or gangrene are sometimes observed in emaciated children. The term *intertrigo* has been applied to different morbid changes in the skin. There can be no doubt that a predisposition to intertrigo exists (Hebra), as we frequently observe, that the children of labourers lie in their excretions during the whole day without suffering from intertrigo, whilst sometimes the children who are best cared for, are very liable to this affection. In the same way as bed-sores occur mostly in patients reduced by disease, so intertrigo would appear to depend upon nutritive or other disorders, although its frequent occurrence in children cannot entirely be attributed to disturbance of nutrition.

f. *Erythema nodosum* is dependent upon a sero-hæmorrhagic exudation in the deeper layer of the skin, and occurs especially on the lower extremities and face in the form of tumors (from the size of half-a-crown to that of a man's fist), and is usually associated with collateral œdema of the superficial layer of the cutis. These tumors are separated from one another ; are at first colourless, and later become yellow, and according to the varied tint of the exudation, also brownish-red or bluish in shade, so that the affected parts look as if they had been subjected to contusion. Thus children have been brought to me from schools, the teachers of whom were accused of having beaten them, whilst really they were suffering from erythema nodosum. The affection occurs most frequently in young people, and the symptoms preceding the phenomena on the skin, are: loss of appetite, tenderness on pressure of the stomach, fatigue after any exertion, etc.*

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* Bohn (Jahrbuch für Kinderheilkunde, Heft 4, 1868) regards erythema nodosum as the same affection as *peliosis rheumatica.* Each papule represents in some degree an inflammatory infiltration, which arises from embolism of the cutaneous capillaries. This is the case also in peliosis rheumatica, which frequently appears simultaneously with erythema.

In cases in which the collateral œdema occurs on the extensor surface of the knee-joint, it may readily be confounded with serous effusion into the joint, especially when the œdema fills up the hollows on either side of the patella. When the affection occurs on the face, the eye-lids become swollen, as in dropsy, and the inflammation is frequently seen to extend along the course of the lymphatics.

In rare cases erythema nodosum occurs as a chronic affection, producing a hard, thickened, and infiltrated condition of the skin; and the diagnosis can only be established from the dark-red periphery of these patches, which vary in size from that of half-a-crown to that of the palm of the hand.

The *prognosis* is favourable, as the affection usually disappears after a few weeks, rarely lasting months.

Treatment. As all the erythemata disappear spontaneously after short duration, the only treatment required in erythema nodosum is to place the affected limb in a horizontal position, and to apply cold bandages either alone, or in combination with Goulard's lotion; when the cold is disagreeable, tepid bandages may be resorted to. For the treatment of erythema entertrigo, see eczema.

2. PELLAGRA.

In treating of this affection we can only adduce the experience of others, as we have had no opportunities of observation. The disease prevails amongst the poorer inhabitants of Venetia, Lombardy, Piedmont, Parma, Modena, Ferrara, Bologna, and Tuscany; also in the South of France, Asturies (mal de la Rosa), in the vicinity of Alcaniz (mal del higado, or mal del monte), in Fermosella and Galicia, and sporadically, also in other countries.

During the first stage, the appearance of erythemata on the skin is one of the phenomena, indicating the existence of this disease in the organism. The affection occurs in spring and summer, especially from April till June, and appears on parts of the body exposed to the sun, as on the hands, the extensor surfaces of the forearms, neck, chest, back, and in women also on the face. At the commencement of winter the affection usually subsides, leaving discoloration and desquamation. A few days after the appearance of the maculæ, branny desquamation takes place, and the skin looks as if lime-water has been poured over it. On the shedding of the scales, the skin appears bright red and glistening, but gradually assumes a dull white aspect. The subjective symptoms are a burning sensation in the skin, lassitude, mental disturbance, and the patients become silent and despondent.

In the *second stage* there is headache, giddiness, convulsions, loss of muscular power, impairment of mind, religious melancholy, and later, emaciation, œdema, dropsy, and acute inflammation of internal organs, which soon lead to a fatal result. The skin becomes thickened, dark, and shrivelled, and there is an appearance of *cutis anserina* (Strambio). The epidermis is shed in scales, the sebaceous glands are indicated by black points, acne indurata arises, and the cutis become atrophic, thin, and glistening. This disease has not yet been elucidated by the morbid anatomy. The duration of the disease is from three to five, rarely from eight to twelve years; it attacks women more than men, usually between thirty and thirty-five years of age. The cause of the disease is ascribed by some Italian physicians to the use of maize as food (Pollenta); by others, to vegetable parasites, which exist in that article of diet. Dr. Ullersperger quotes (from Il Siplo medic., Madrid) reliable investigations, which have been made in Spain, that none of the patients had used maize as food, and that in all the disease commenced on the hands.[*]

As regards the treatment, change of air and diet, is all-important; besides this, arsenic may be useful.

3. ROSEOLA.

Of the several varieties of roseola enumerated by Willan (*miliaris, annulata, autumnalis*, etc.), the skin eruption, which appears in forms during the various stages of exanthematic typhus, particularly merits attention. As is well known, there are epidemics in which especially this erythematous efflorescence, as well as petechial-like hæmorrhages, appear at the commencement of typhus, and when such a complication exists the prognosis is extremely unfavorable. If recovery takes place in such a case, desquamation of the epidermis results.

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[*] Frankel (Virchow Arch. 43. B., 3 Heft) translates some of Dr. Golgi's published cases, with the results of post-mortem examination (Gazett. med. Prov. Venet., Anno XI).

In one case, erythema and desquamation occurred on the back of the hand and on the neck; after a year, ensued, giddiness, debility, formication on the back, and an olive-green colour of the skin. There were symptoms of systolic heart-murmur, and death was preceded by paraplegia; in another case, published by Prof. Lambrosio, there were, besides, symptoms of melancholia; and in a third, there were severe attacks of mania. The post-mortem examination showed degeneration of the tissue of the heart, the liver and kidney were fatty, and besides numerous fat cells in the walls of the cerebral capillaries, there were also yellow pigmentary deposits.

The so-called *roseola rheumatica,* an eruption distributed over the entire surface, especially around the smaller joints, in the form of small red patches, and associated with considerable pain and swelling of the joints, is to be regarded as a form of erythema, but not as an affection *sui generis,* as indeed erythematous eruptions accompany the most varied febrile diseases.

4. URTICARIA.

(*Cnidosis, Febris urticata, Nesselsucht, Porzellanfieber*).

The characteristics of urticaria are: an eruption of wheals (pomphi), *i e.,* an efflorescence, the superficial area of which exceeds the thickness, varying in size from that of a millet-seed to that of the palm of the hand, the centre of which is pale, surrounded by a red ring; wheals may occur over the entire surface, produce severe burning and itching, are accompanied by œdematous swelling in their vicinity, and usually disappear rapidly. The eruption arises from exudation in the superficial layer of the corium, which may be produced also artificially by injecting water subcutaneously, directing the syringe horizontally and towards the surface, by which the blood is expelled from the superficial capillaries. In rabbits, which were stung with fresh nettles, I was enabled to examine, microscopically, the wheals thus produced, and found œdematous swelling and deficiency of blood in the tissue of the cutis.

Etiology. This affection is due to the use of certain kinds of food (idiosyncrasy existing in some individuals), as oysters, snails, lobsters, fish, mushrooms, cucumbers, strawberries, vinegar, honey, sausages, etc.; or it depends upon derangement of internal organs (as digestive and especially uterine and ovarian disorders); urticaria may also be produced by irritants, which act directly on the skin, as for instance, nettles, stings of insects, scratching, or inunction of oil of turpentine. The internal administration of balsam of copaiva and cubebs, also sometimes causes urticaria. Lastly, intestinal worms (oxyuris vermicularis, tænia, etc.) are sometimes connected with urticaria.

The course may be *acute,* lasting usually from a week to a fortnight, frequently a shorter time, and the wheals disappear either with or without desquamation; in many cases the eruption is also accompanied by febrile symptoms: or *sub-acute,* the eruption of wheals re-appearing, from time to time, influenced by definite causes. Urticaria is most common on the trunk; when occurring on the face, it is usually associated with œdema of the eyelids.*

Complications of urticaria occur with *prurigo*, especially in children, the wheals being produced by the slight but continued scratching; and with *erythema urticans*. The latter affection also termed *lichen urticatus*, or more correctly *urticaria papulosa*, occurs mostly on the dorsal sufaces of the hands and feet, and on the face, in the form of pale-red papules or tubercles, from the size of a pin's head to that of a pea, and resembles urticaria in its course, being acute, sub-acute, or chronic. In the acute form, the eruption disappears in one or two weeks; in the chronic form, it may last months and even years, and when occurring on the face, is extremely disagreeable for the patient, as only a practised eye can distinguish it from tubercular syphilis.

The *treatment* of urticaria is to be directed towards the removal of the causes as well as the local condition; when the disease arises from digestive derangement or external agencies, the treatment is usually successful; rarely, however, in cases in which the disease depends upon disorders of the sexual system, and chronic affections of the organs. The local treatment consists in the employment of cold douches, baths, and bandages, or in sponging the surface with dilute vinegar, or a lotion consisting of alcohol (℥vi.) and acetic acid (ʒj.), or aqua Coloniensis, or in dusting the skin with powdered starch. Lotions of acetic and citric acid are of little value, as also dilute sulphuric acid. In the chronic form of urticaria papulosa, however, the Emplastrum mercuriale is usefully employed, the affected part being covered with it during the night.

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* Dr. Jüte (Zeitschrift für klin. Med., 1859) describes *urticaria hæmorrhagica* as follows:—on a portion of the skin of about the size of a shilling a reddened and itching wheal is formed, and after a few hours the redness assumes a darker tint; subcutaneous hæmorrhage follows, and the extravasation undergoes various changes of colour. Similar eruptions have been described by Willan and Rayer under the name of *purpura urticata*.

The affection is termed *urticaria bullosa* when the wheals develop into blebs, the contents of which become dried up into crusts.

Dr. Willan (Schmidt's Jahrbuch, 1860) describes, under the name *urticaria evanida*, two different forms, one of which arises spontaneously and disappears rapidly, whilst the other is produced by friction on the skin and the action of the cutaneous muscles. The latter is regarded by this author as a special form, *urticaria factitia*, as he never observed it associated with the first form. On tracing figures, lines, etc., with a blunt-pointed instrument on a susceptible skin, these appear as elevated and distinct ridges (from serous exudation). While this muscular irritability exists more or less in all, it may in some cases become morbidly increased, and give rise to considerable inconvenience; in such cases even the use of a sponge in washing may produce urticaria. The wave-like ridges are due to the contraction of the muscles of the skin (?); chloroform and ice prevent or remove these contractions.

Urticaria tuberosa (Pet. Frank) has been observed by Dr. Fouquet in five cases (Berl. klin. Wochenschr); it presents itself in the form of whitish and moveable tumors, varying in size between a walnut and a hen's egg, occurring especially on the lower extremities, and lasting at most twenty-four hours; their disappearance is followed by desquamation.

5. ERYSIPELAS (*Rothlauf, Hautrose*).

Erysipelas is a diffused inflammation of the skin, usually arising from infection, which rapidly spreads over extensive surfaces, and is attended with febrile disturbance. In most cases the disease commences with shivering, followed by elevation of the temperature of the body (to 40° C.). At the same time also, morbid conditions of the stomach and brain (delirium, somnolence) may appear, the latter especially when the erysipelas involves the face and head. These symptoms become more intense with the progress of the disease, sometimes reaching an extreme degree, and decline with the subsidence of the phenomena on the skin, which usually takes place between eight and fourteen days. The inflammatory process involves either the superficial layers of the cutis (papillary body), *erysipelas erythematosum,* or the entire corium ; involving also to a considerable extent the subcutaneous cellular tissue, *erysipelas phlegmonosum.* With the decrease of the morbid process the skin becomes pale-red, the swelling diminishes, leaving only slight œdema for some time afterwards ; the skin is also covered with abundant scales or crusts, and in the neighbouring parts, the subcutaneous cellular tissue not rarely suppurates, abscesses and boils being thus formed. The hairs of the face and scalp fall out, but a new growth takes place. The disease rarely leads to gangrene of the skin.

The part of the skin attacked by erysipelas is swollen, variously reddened, hot, and either limited by a distinct border (*erysipelas marginatum*), or blended with the healthy portions (*erysipelas diffusum*) ; the skin sometimes shows blebs, or is covered with crusts. The various forms of the disease are distinguished as follows :—erysipelas erythematosum, e. vesiculosum, e. bullosum, e. pustulosum, and e. crustosum. Erysipelas either remains limited to the part originally attacked, (*erysipelas fixum*), or extends, involving large portions of the skin, disappearing from the parts first affected, and occupying a new situation, (*erysipelas migrans*). Those forms of the disease distinctly margined always migrate, whilst the other varieties remain stationary. The migratory forms are characterised by the constant recurrence of the disease on the part originally attacked; as for instance, erysipelas which migrated from the face to the scalp, neck, back, and lower extremity, after running its course on these parts, re-appears again on the face.

The most frequent forms of erysipelas occur on the face, being produced by affections of the mucous membrane of the nostrils, as eczema, lupus, and syphilitic ulcers, also by disease of the periosteum and bones, as caries and necrosis. Eczema is one of the most frequent causes of erysipelas, occurring repeatedly within a year, *habitual erysipelas*, every recurrence of the eczema being attended with erysipelas; these phenomena are explained by the accumulation of crusts in the nostrils, impeding the escape of the eczematous excretion, which undergoes decay, and being absorbed by the lymphatic vessels, induces erysipelas. People who suffer from repeated attacks of erysipelas, are liable to chronic œdema of the lower eye-lid, and the latter condition also occurs consecutively to caries and necrosis of the nasal bones. The migratory form of erysipelas extends from the face to the forehead, hairy-scalp, and neck. As the existence of the disease on the scalp cannot be ascertained by inspection, especially when the hair is abundant, the diagnosis is based upon the presence of permanent febrile symptoms, tenderness on pressure, and a peculiar spongy feel of the part. These symptoms are important, as from desquamation on the face, we may anticipate the disappearance of the disease, whilst the real danger only begins at this period.

Erysipelas odontalgicum is usually limited to the cheeks and eyelids, being set up by chronic suppuration in the fangs of the teeth, and subsides on removal of the cause. Other forms are due to disease of the external auditory meatus, *e. otalgicum;* to abscess in the mammary glands, *e. mammarum;* to suppuration of the navel in children, *e. umbilici;* to circumcision, *e. genitalium;* to variolous, vaccine, or other suppurative processes, *e. extremitatum;* and to purulent absorption by the lymphatics in abscesses of the hands and feet, *e. migrans.*

The *etiology* of erysipelas has not yet been cleared up; there is usually a local source of suppuration, from which the immediate vicinity becomes infected, and it would seem that this occurs chiefly through the medium of the lymphatic absorption. There are, however, forms of erysipelas which are apparently independent of any local source, and in such cases we are obliged to assume the existence of a blood contagion, which nevertheless may have originated locally, although this is not always traceable. In spring and autumn especially, the outbreak of erysipelas in hospitals is justly dreaded by surgeons.*

* Billroth (Arch. f. klin. Chir. Berlin, 1867) refutes the theory of epidemic erysipelas, and agrees with Lawrence and Hebra in regarding the spread of the disease as due to local infection. We quote from his interesting paper the following important observations:—Erysipelas proceeds most frequently from wounds of the lower extremities, face, etc., and therefore takes its origin locally, the general symptoms only appearing later, whilst other similar diseases, as measles and scarlatina, appear at once over the entire cutaneous surface. Erysipelas capitis is always *traumatic*, *phlogistic*, or *septic* (in the widest sense of the term); there must be some irritating material, capable of producing inflammation, which circulates through the skin until it meets with an obstacle to its progress, or until the poison itself is destroyed; the *materies morbi* is also "pyrogenic." Billroth further believes that the infecting material becomes mingled with the nutritive fluids with which it is distributed, following the course of the capillary lymphatics. The occurrence of red patches indicates that the irritating material produces fluctuating dilatation of the blood-vessels, always involving certain circumscribed vascular areas at a time. As the lymphatics usually follow the course of the veins, the entrance of the poison into a lymphatic network, which is provided with slightly lateral afferent vessels, will induce irritation of the corresponding vascular network, a red patch on the skin being thus produced; the poison also follows the course of the smaller lymphatics in the skin: the glands are always swollen. Erysipelas arises from infection of the blood after operations, or from poisons which have been introduced into wounds by sponges, compresses, etc.

P. Hinckes Bird, who divides erysipelas into *idiopathic* and *symptomatic*, has collected 260 cases, which are interesting on account of the seat of the disease.

Erysipelas idiopathica of the head and face	occurred in	34 males	and	51 females
„ traumatica	„ „	27 „		13 „
„ idiopathica of the extremities	„	27 „		22 „
„ traumatica „	„	59 „		27 „

In 81 cases of idiopathic erysipelas on the face, the different parts were attacked in the following order of frequency:—

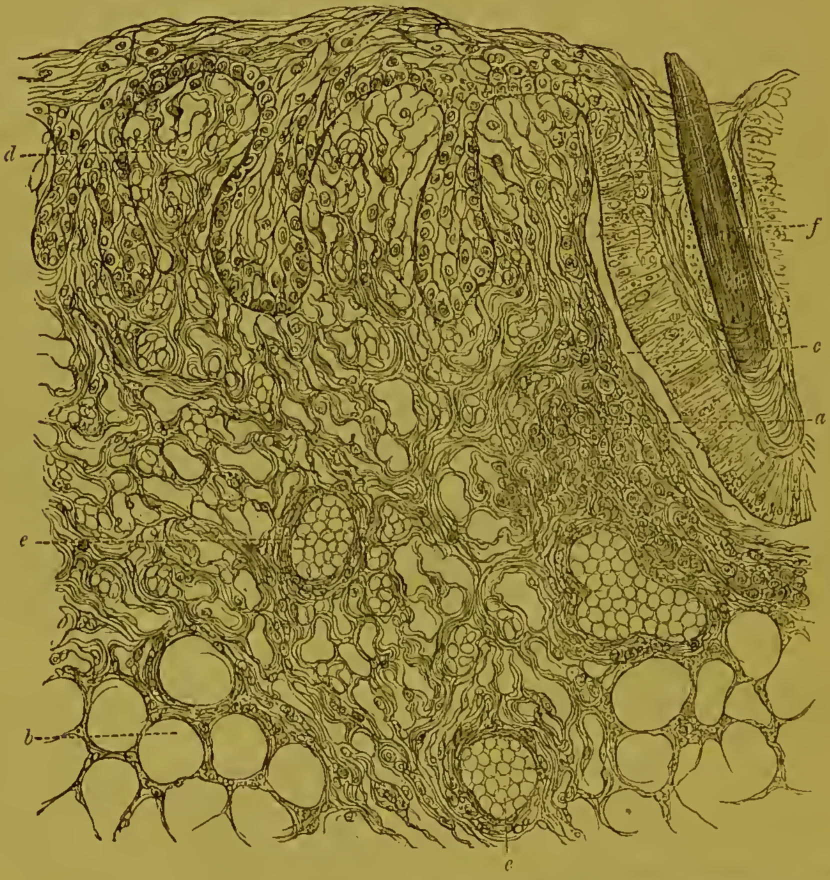
Right side of face	56 p.c.	females
„ „	50 „	males
Left „	19 „	females
„ „	29 „	males
Middle line„	13.7 „	females
„ „	11.8 „	males
Both sides simultaneously	5.9 „	females
„ „	2.9 „	males

In the 260 cases observed, 20 *i.e.* 7½ p.c. terminated fatally. In regard to the season of the year, 66 occurred in spring, 49 in summer, 56 in autumn, 89 in winter; thus the disease is much more frequent in winter and spring than in summer and autumn.

Primararzt Dr. C. Haller, on the other hand, found from a collection of all the cases of erysipelas which occurred in the General Hospital in Vienna during 10 years, that the majority appeared in the months of April, May, October, and November.

In acute cases of erysipelas the prognosis is uncertain, as we cannot prevent the extension of the disease to the internal organs, and the deposit of inflammatory products which cause progressive infection of the skin. The unfavorable termination is induced by pyæmia, pneumonia, œdema of the brain and more rarely by meningitis or nephritis. It is only in evidently local cases, as those resulting from abscesses, that the prognosis is favorable.

Fig. 11.



a. Cell-infiltration of corium. *b.* Empty fat cells with cell-growth around limiting membrane. *c.* Separated connective tissue fibres. *d.* Enlarged papilla with cell-growth. *e.* Distended blood-vessels. *f.* A hair loosened from outer root-sheath.

Anatomy. Erysipelas consists in a cell-infiltration of the corium, and in the severe forms, also of the subcutaneous areolar tissue, the blood vessels at the same time appearing dilated. The connective tissue fibres lose their distinct margins, increase in breadth, become swollen, and finally remain as a homogenous mass.

By a considerable accumulation of cell-exudation a purulent cavity is sometimes formed in the papilla or in the tissue of the cutis itself. At other parts the connective tissue fibres are separated by effused fluid, the blood-vessels also being distended; the entire Malpigian layer appears shrivelled, the nuclei are enlarged and exhibit in their interior one or two nucleoli.* The cells of the hair-follicle are enlarged, as also those of the outer root-sheath, and of the basement membrane of the sebaceous gland, whilst those of its epithelium, containing sebaceous matter degenerate into a friable mass. The hair-follicle is separated from the root-sheaths by serous exudation, the hair loosened from its papilla, and the outer root-sheath separated from the inner layer of the follicle, as far as the point at which the latter joins the papilla, and both root-sheaths become pressed and adherent to the hair-shaft. *(Haight).* The cell-proliferation is more marked in the *phlegmonous* than in the *erythematous* form of erysipelas. The observations of Biesiadecki (Sitzungsber, d. k. Akad. d. Wissensch., 1867) accord with my preparations (one of which is represented in Figure 11).

On post-mortem examination of a fatal case of erysipelas we may find anæmia, in consequence of the widely diffused inflammation, or hyperæmia and acute cerebral œdema, hypostatic pneumonia, œdema of the lungs or glottis, peritonitis, pleuritis, or pericarditis. We observe further, enlargement of the heart with a degenerated and lacerable condition of its muscular fibres; there is sometimes also parenchymatous inflammation of the liver and kidneys. The intimate structure of the vessels shows granular fatty deposits.†

Treatment. The primary indication in erysipelas, as in other febrile diseases, is the treatment of the symptoms; we prescribe acids, and if rigors occur, quinine.*

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* Volkmann and Steudener found the entire cutis and subcutaneous areolar tissue infiltrated with minute cells, and the vessels distended; the papillæ entirely occupied by their capillary loops; and the vessels surrounded by granular cells (white blood-corpuscles). The cell-infiltration is more marked in the deeper, than in the superficial portions of the cutis. The cell-mass rapidly disappears, however, and after two or three days, only the finely granulated débris is seen in the subcutaneous cellular tissue (Centralblatt für med. Wissensch., 1868).

† Inoculation with the contents of erysipelatous blebs (performed in rabbits) proved fatal in a few days, and the dissection showed granular degeneration of the muscular fibres of the trunk and of the heart, the cells of the liver and the epithelium of the tubuli uriniferi swollen, degenerated and partly infiltrated with fat. (Liebermeister, Schmidt's Jahrbuch, 1868.)

The local treatment however is more important, especially in cases in which erysipelas has been induced by abscesses, ulcers, eczema, etc. By the removal of the source of suppuration in such cases, lymphatic absorption is prevented, and therefore also the continuance of the erysipelatous process. In regard to the use of warm or cold applications, it is found that at the commencement of the disease when there is considerable fever, and in cases in which the skin is much swollen, cold (in the form of ice-bags) is not only the most agreeable to the patient, but also the most effectual remedial agent in this, as in all other forms of inflammation. It is scarcely necessary to observe that there is no danger of "driving in" the disease by this means,—inducing inflammatory metastases to internal organs. During the subsidence of the disease the cold usually becomes disagreeable to the patient, and he prefers warm applications. The inunction with mercurial ointment may at first be useful, but must not be continued long enough to induce salivation. In erysipelas migrans the *Emplastrum mercuriale* may be applied at the margins. The method of cauterising the borders of the part affected with erysipelas by means of solid nitrate of silver, is more painful than useful. There are some who advocate the plan of painting the entire erysipelatous surface as well as the surrounding parts with a solution of nitrate of silver (1 to 8), or with tincture of iodine. Painting with collodion, or gutta-percha dissolved in chloroform, is agreeable to the patient so long as the evaporation of the chloroform produces a sensation of cold, but the employment of ice-bags is to be preferred either alone or in conjunction with these remedies. Creosote in the form of ointment has been recommended, as also painting with turpentine, and with a solution consisting of alum, white precipitate and glycerine. The use of the sesquichloride of iron and of sulphate of iron, in the form of ointment as local remedies, has also been proposed. The treatment by venesection, cupping, scarification, leeches, etc., is not more successful in arresting the morbid process than the expectant method.†

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* Dr. L. Mathey gives 20 to 30 drops perchloride of iron, and believes that by this remedy the duration of the disease is limited to two or three days. Of 10 patients thus treated 3 recovered after 2, 3 after 3, 2 after 4, 1 after 5, and 1 after 7 days; this treatment is especially valuable in the case of lymphatic and debilitated subjects.

† Lebert is opposed to the expectant treatment, as he believes that it is followed by frequent recurrence of the disease, and he advises local abstraction of blood from the head, emetics in large doses, local inunction with oily substances, low diet, and frequent purgation.

2. *Phlegmonous Inflammation.*

1. FURUNCULUS (*Blutschwär, Boil*).

The two forms of furunculi are distinguished according to the intensity of the morbid process: *a.* follicular furunculus, *b.* furunculus of the areolar tissue.

a. The term *follicular furunculus* is applied to a circumscribed inflammatory infiltration originating in a hair follicle or sebaceous gland, which is characterized by its consistent structure, deep redness and slow suppuration. The first symptoms of furunculi are pain and tension in the affected part, even before the skin becomes reddened; by touch, however, the infiltration may be recognised. On cutting into such a part we find embedded in it a yellow exudation in the form of a plug, which is firmly connected with the surrounding tissues; this exudation acts as an irritant on the adjacent parts, inducing hyperæmia and inflammation, and thus the part becomes swollen and raised above the surface of the skin. Suppuration soon takes place in the vicinity of the exudation which thus becomes loosened along with the involved fibres of the corium, and is finally thrown off: the arteries and veins in and around the exudation are filled with coagulated blood. When this plug-like exudation is extruded, the swelling disappears, the pain subsides, and the loss of substance is repaired by a cicatrix, the size of which corresponds with that of the furunculus. The occurrence of several furunculi at the same time is accompanied by febrile disturbance.

b. Furunculus of the areolar tissue is a diffuse, dense infiltration in the corium, which becomes gangrenous over large areas, the destructive process involving the subcutaneous tissue to a considerable depth. These furunculi are epidemic in children, and it frequently happens that suppuration has taken place in the subcutaneous cellular tissue before the appearance of these semi-globular boils, which often become confluent, large portions of skin being thus thrown off, and even the muscular tissue itself exposed. The special seats of such furunculi are the scalp and the extremities, particularly the thigh; children suffering from marasmus are most liable to the disease.

The causes of furunculus are usually local; they occur as the result of itching skin affections, as scabies, eczema, and prurigo, or from irritation of the skin by stimulating ointments (as those of sulphur and metallic salts), or from pediculus vestimentorum, or lastly from too frequent use of cold or warm baths, or powerful douches. Further, they may occur in consequence of breathing foul air, as in ill-ventilated rooms where many people are congregated, or from living in a damp locality. When furunculi occur simultaneously on different parts of the body and reappear frequently, the disease is termed *furunculosis*; this affection is the result of general mal-nutrition, chronic influenza, intermittent fever, and is also associated with diabetes mellitus. Furunculosis, like erysipelas, appears as an epidemic in spring and autumn.

The distinctions of furunculi, from the manner in which the pus is discharged, are superfluous as *f. simplex,* when the purulent matter is extruded at a single point; *f. vespajus,* when at several points; and *f. pannulatus,* when the pus escapes through a small fissure.

2. ANTHRAX *(Brandschwär, Carbuncle).*

Anthrax differs from furunculus in the gangrenous destruction extending deeply into the skin, involving corium and subcutaneous areolar tissue, which are extruded in sloughing masses along with purulent matter at several sieve-like openings, corresponding to the numerous plug-like sloughs. The part surrounding the carbuncle is reddened, and is hardened by the plastic infiltration, the vessels are occluded (Infarcte); the subcutaneous tissue is involved, and in it the suppuration commences. In large carbuncles, especially on the head, the danger arises from the extension of the phlebitis to the brain. The special seat of anthrax is the skin of the neck, back, lips, and forehead; it more rarely occurs on the extremities. The growth of a carbuncle is attended with severe pain, the intensity of which depends upon the nervous supply and sensibility of the involved part. At the beginning as well as during the course of the disease there is febrile disturbance, and later, when the morbid process does not become limited, rigors and symptoms of pyæmia set in. Bourden (Gaz. des hospit., 1869, 76) notices the occurrence of diuresis in furunculus, and disputes the connection of anthrax with diabetes.

Treatment of furunculus and anthrax. As in other affections, we must endeavour to ascertain the causes, in order to prevent the frequent recurrence; thus people who have suffered for years from boils, in consequence of living in closed rooms, such as comptoirs and bureaux, may be freed from the predisposition to furunculosis by exercise in the open air and regulation of diet. The beneficial effects resulting from drinking mineral waters at the springs (as those containing carbonic acid), are to be attributed rather to the changed mode of life than to the waters themselves. In some obstinate cases, we use *Rob. juniperi*, whilst Hardy recommends *Aqua Picea.*

Although painting with tincture of iodine, sesquichloride of iron, or nitrate of silver, and the inunction of mercurial ointment, have been recommended with the view of preventing the development of furunculi, these means fail in accomplishing the object; the most efficient method consists in opening the boil with the knife as early as possible. In order to lessen the pain during the operation, we apply a freezing-mixture (made of two parts ice, and one part common salt) as an anæsthetic, by which a temperature of 3° F. is obtained; the mixture is placed in a muslin bag and applied to the affected part for about ten minutes, the surrounding parts being protected by adhesive plaster; the furunculus is then cut, and we subsequently apply cold bandages. This method is more successful in shortening the morbid process than the treatment by adhesive plaster and poultices, and is also suitable in cases of anthrax, with the modification that we have to make crucial incisions. Instead of the freezing-mixture, local anæsthesia with ether by Richardson's method may be adopted.*

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* Prichard (Brit. Med. Journal, 1863) agrees with Physick and Travers in recommending the use of caustics in the treatment of carbuncle. Caustic potash is rubbed in freely in the centre of the carbuncle, so as to produce an eschar over at least the third or fourth part of the indurated mass; a solution of iodine in collodion, applied at the circumference, has an excellent effect in destroying the erysipelatous element of the disease.

Demiré (Gazette des Hop., 1865) advocates early incision followed by the immediate application of the actual cautery, Canquoin's or Vienna paste, or a solution of 20 p.c. of sesquichloride of iron; by these means, he supposes that the absorption of the gangrenous products by the cut vessels may be best prevented. (This seems to me an unnecessary precaution.)

Soulé (Journ. de Bord, 1866) opposes the treatment by the knife, and prefers the expectant method, applying only softening poultices. In the case of a large carbuncle, he first destroys it with Vienna paste, and only the next day incises the part, and further employs tincture of iodine.

Alph. Guéric advises subcutaneous incision, which also finds advocates in Gosselin, Laugier, and Ricord. Velpeau, on the other hand, with Nelaton and Richet, prefer early incision.

3. BOUTON D'ALEP.

This affection consists in a chronic inflammatory infiltration of the cutis (J. Polak, Allg. med. Zeitschr.), which is most commonly located on the external angle of the eye, lower eye-lid, cheeks, point of the nose, lips, and especially the lower limbs; it attacks chiefly Europeans living in the East, at places where it is endemic, as on the banks of the Tigris and Euphrates, at Aleppo and Bagdad, and also in Cyprus, Cairo, Suez, and Teheran. The natives are most liable to the disease when under seven years of age; foreigners may be attacked at any age; and it occurs only once in a lifetime. The affection commences as a reddish papule, which gradually ulcerates, presenting serous granulations; the borders of the ulcer are thick and infiltrated. After eleven or fourteen months' duration the ulcer heals, leaving a cicatrix. As to treatment, cauterisation with nitric acid is recommended.

4. PSEUDO-ERYSIPELAS.

This term is applied to a diffuse phlegmonous inflammation of the skin, which is the result of local infection by putrid animal poisons, or of unknown causes. The infiltrated skin is considerably reddened, swollen, inflexible, and highly painful; at the same time, also, there is general febrile disturbance. The inflammatory process usually terminates in suppuration; abscesses being thus formed in the subcutaneous areolar tissue, which become confluent, and undermine large portions of the skin. Lastly, the cutis itself is fissured, and large tracts of the soft tissues may become gangrenous; in the severer forms of the disease, even the bones may be denuded of the periosteum, and undergo necrosis. The danger of pyæmia in this disease is especially imminent.

The *treatment* consists chiefly in antiphlogistic measures. The escape of pus is to be facilitated by early incision; gangrenous portions of the skin are to be removed in order to prevent purulent infection of the blood. When the disease involves large tracts of the skin, as, for instance, an entire limb, the case usually terminates in fatal exhaustion or pyæmia.

3. *Vesicular Inflammation.*

1. HERPES (*Bläschenflechte*).

Herpes may be defined as an acute non-contagious skin affection, which runs a typical course, and is attended with the formation of vesicles or blebs in groups, on an erythematous surface ; the efflorescence being usually preceded by symptoms of fever. The eruption is accompanied with burning pain, which is so intense in many forms of herpes as to resemble neuralgia ; this pain may continue even long after the disappearance of the eruption.

The following varieties are distinguished according to the locality, form, and grouping of the vesicles :—*a.* Herpes labialis ; *b.* H. præputialis, or progenialis ; *c.* H. Iris ; *d.* H. circinatus ; *e.* H. Zoster.

a. Herpes labialis or *facialis, Hydroa febrilis.* This affection appears in connection with certain febrile diseases, and occurs frequently on the red parts of the lips in the form of groups of aggregated and variously sized vesicles, which dry up into crusts, and disappear within a few days, without leaving cicatrices.* Simultaneously with this eruption on the area of the lips, or independently of it, similar groups of herpetic vesicles appear on the mucous membrane of the hard and soft palate, which, from the delicacy of the epithelium, rapidly burst and are only indicated by red points, destitute of epithelium.† The eruption of herpes occurs also on other parts of the face, without necessarily being associated with febrile affections, as on the forehead, eye-lids, nose, and nasal mucous membrane, external ear, chin, and cheeks. Lastly, we may mention those forms of herpes (associated with feverish symptoms), which occur in young people every year at a particular time, forming numerous groups of vesicles, at first on the extensor surfaces of the elbow and knee-joints, and later on other parts of the skin, especially the cheeks. This form of herpes is doubtless frequently confounded with miliaria.

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* Prof. Gerhardt explains the origin of *herpes facialis* as follows :—The minute arteries which accompany the branches of the trigeminus in the osseous canals, undergo contraction at the beginning of the febrile attack, followed, however, by dilatation in the hot stage, whereby the minute branches of the nerves are subjected to pressure and irritation, as the result of which vesicular dermatitis arises. Gerhardt lays stress on the fact that this eruption occurs particularly in the area between chin, ears, and eye-brows.

† Dr. Bertholle (L'Union, 65, 68, 70. 1866) describes cases in which herpes of the soft palate appeared suddenly in perfectly healthy subjects, accompanied with considerable febrile disturbance and difficulty of swallowing, severe headache, rapid pulse, and heat of skin. On the first and second day, the pharynx and tonsils already appear reddened and swollen, the latter being covered by small yellowish spots (of the size of a millet seed), which are only rarely seen on the anterior or posterior portion of the palate, and never on the posterior wall of the pharynx ; even in the case published by Motet (L'Union, pag. 419, 1858), in which the eruption of herpes extended over the entire isthmus faucium, the buccal mucous membrane, as well as to the extremities, not a single vesicle was

b. Herpes progenialis (*præputialis*). On the male and female genital organs, groups of vesicles frequently appear, which exist as such only for a short time, as the epithelium (from the high temperature) rapidly becomes macerated and thrown off. The parts thus denuded of epidermis become irritated, inflamed and covered by a yellow purulent crust, or even by a diphtheritic pellicle as the result of the abundant sebaceous secretion in the male, and of a leucorrheal discharge in the female, as also from the contact of two opposed cutaneous surfaces. From the long continued action of such injurious influences, and especially in cases in which there is a narrow prepuce, the seat of the excoriation may completely resemble a venereal ulcer, and the difficulty of the diagnosis is increased by the simultaneous swelling of the inguinal glands. In such cases we must postpone the definite diagnosis until the removal of the above-mentioned causes, which is accomplished by separating the opposed cutaneous surfaces by means of charpie, or powdered starch ; an interval of a few days will enable us to establish the difference, for, under this treatment, an ordinary herpes will have completely or almost disappeared, whilst a specific ulcer retains its former character. Besides, the purulent secretion of a chancre is considerable, whilst from the

observed beyond the isthmus faucium. Usually, the vesicles do not become confluent; they leave flat ulcers, which soon heal. The sub-maxillary glands are but slightly swollen and painful; more frequently, however, there is pain in the neighbourhood of the tonsils, which is increased on pressure, and sometimes extends to the ear. Lastly, after a few days, the herpetic eruption appears on the commissure of the lips and nose, which usually may be accepted as a sign of a modification of the symptoms and of recovery.

In women, it is important to ascertain the state of the menstrual function, as the liability to herpes is increased by irregularity or interruption in the occurrence of the menses, arising from any cause. There are doubtless acute and diffuse inflammatory affections on the mucous membrane of the mouth and palate, which may also assume the vesicular character; these, however, are not varieties of herpes, but are rather to be regarded as aphthous inflammatory affections.

excoriations of herpes, the discharge of pus is either slight or entirely wanting. Inoculation with the secretion in the beginning would be the surest method of determining the nature of the disease, but this cannot usually be effected. In the case of such an eruption of herpes being located on an inflamed and indurated base, it might be confounded with the commencement of an indurated (venereal) sore, and only the gradual development of the hard base in the latter, will determine the diagnosis. These herpetic eruptions are liable to recur in many persons at stated times, and besides causing the inconvenience we have described, they also increase the liability to infection during impure connection.

c. Herpes Iris commences as a central papule, which soon becomes a vesicle, and is surrounded by new vesicular groups. These clusters of vesicles either become confluent, so as to form a large bulla, or the central part of the efflorescence undergoes desiccation, whilst successive outbreaks occur in the periphery; the exudation which has been deposited at different times assumes various tints, from which phenomenon the term "Iris" is derived. The contents of the earlier vesicles are purulent, those of later date sero-purulent, and those of recent origin serous. In some cases, however, the successive outbreaks occur so rapidly as to cause the confluence of all the earlier vesicles into one large bulla, which obliterates the various tints. The affection appears most frequently at first on the dorsal surfaces of the hands and feet, and only at a later period on the rest of the extremities, being, however, usually limited to the forearms and legs; the trunk and face are generally exempted. In severe cases the eruption is accompanied by febrile symptoms. Herpes Iris occurs mostly in spring and autumn; many persons are liable to repeated attacks, and the eruption disappears after eight or fourteen days, sometimes, however, after a longer duration.

d. Herpes circinatus is only another form of H. Iris, in which the disease extends from the periphery by the formation of vesicles, whilst desiccation has taken place at the centre. In the periphery several rings of vesicles are formed simultaneously, and are preceded by livid reddening, which always indicates new outbreaks.

e. Herpes Zoster (Gürtelauschlag, Shingles) is an eruption of vesicles occurring in groups, which correspond to the distribution of certain cutaneous nerves, and which are confined to one half of the body, rarely occurring on both sides.*

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* Bærensprung (d. Gürtelkrankheit, Charité—Annal. IX, S. 44) observed one case of H. Zoster on both sides. Hebra and the author have seen it several times. Thomas (Arch. f. Heilkunde, III Heft, 1866) mentions three such cases.

The outbreak of the disease is usually preceded by a stinging, burning, and itching sensation, which lasts twenty-four or forty-eight hours, and its intensity is in proportion to the extent of the disease. The neuralgic pain generally subsides on the complete development of the vesicular eruption, and recurs frequently with still greater severity after the crusts have fallen off, especially in those cases in which cicatrices are formed. The vesicles are at first small, later attaining or even exceeding the size of a millet-seed; from their confluence extensive portions of the epidermis become loosened. The efflorescence may at parts be abortive, *i.e.*, there is only a formation of papules. On the summits of most of the vesicles an *umbicle* is observed; the contents are at first transparent, and later assume a yellow colour, from the presence of pus, and even a dark-red tint, from the admixture of blood. The periphery of some of the vesicles is marked by a reddened ring.

According to the seat of Herpes Zoster the following varieties are distinguished:—1. Zoster pectoralis; 2. Z. abdominalis; 3. Z. femoralis; 4. Z. brachialis; 5. Z. facialis et frontalis; 6. Z. collaris; 7. Z. capillitii; 8. Z. perinælis.

We have enumerated the above varieties in the order of frequency of occurrence on the different localities; there is still, however, one form of herpes to be noticed, in which single vesicles are distributed over the entire cutaneous surface, as, for instance, there may be a single vesicle on the back, another on the knee-joint, and a third on the heel; this form is accompanied by severe neuralgic pain.

1. *Zoster pectoralis* commences at the vertebral column, and extends on one side along the course of the ribs to the sternum; its appearance is preceded by intense pain, which might be mistaken for that of commencing pleuritis.

The points at which the pain is located are: first, the *vertebral point*, *i.e.*, the posterior part of the intercostal space, somewhat external to the spinous process, nearly corresponding to the point at which the nerves emerge from the intervertebral foramen; second, the *lateral point* in the course of the intercostal nerves, corresponding to the point at which the superficial nerves are given off; third, the *sternal* and *epigastric point* on the superior intercostal nerves in the vicinity of the sternum, between the cartilages of the ribs, and on the inferior nerves in the epigastric region somewhat external to the middle line, corresponding to the points at which the terminal branches of the intercostal nerves are distributed in the skin (Valleis Deutche, Klinik, 1868).

2. *Zoster abdominalis* corresponds to the distribution of the lumbar nerves, which supply the skin and muscles of the abdominal wall; the efflorescence extends forward to the median line.

3. *Zoster femoralis* appears on the anterior and posterior surfaces of the thigh; on the desiccation and confluence of the vesicles in this affection we might readily confound it with eczema or impetigo.

4. *Zoster brachialis* is located between the fifth cervical and first dorsal vertebræ; and the vesicles extend along the flexor and extensor surfaces of the upper extremity. This affection is frequently followed by neuralgia and even paralysis of the part involved.

5. *Zoster facialis* appears on the cheeks and nose, following the distribution of the trigeminal nerve.

6. *Zoster collaris* (nuchæ) extends from the vicinity of the second and third civical vertebræ towards the lower jaw, the face, and neck.

7. *Zoster capillitii* corresponds to the distribution of the frontal and supra-orbital nerves; simultaneously with this efflorescence, vesicles appear on the conjunctiva, the ciliary vessels are congested, there is intolerance of light, and even iritis.

8. *Zoster perinœlis* follows the distribution of the cutaneous branches of the pudendal nerve, in the perinæum, posterior part of the scrotum, and penis.

Zoster ophthalmicus (Bowman, Hutchinson, and Vernon) is a peripheral neurosis of the terminal sensitive branches of the ophthalmic nerve, followed by corresponding vascular disturbance, with redness of the conjunctiva, intolerance of light, congestion and ulceration of the cornea or iritis. If only the nasal branch of the nerve be involved, the eye is unaffected. On account of severe neuralgic pain, Bowman resorted to division of the supra-orbital and infra-trochlear nerves. Hutchinson found that the affection of the eye only occurs when the vesicles extend from the forehead to the point of the nose; he observed even paralysis of the muscles of the eye-ball (motor branches).

Etiology and Course. As we have previously stated, the eruption corresponds to the distribution of the cutaneous nerves. In cases in which only parts of the nervous area are involved, the cause of H. Zoster may be some partial irritation of the spinal ganglia (*Thomas*), in other cases, groups of herpes arise from peripheral inflammation; wounds also are said to have given rise to this affection. In regard to the relation of the eruption to the sensitive nerves, Bærensprung believes that the pain only arises as the result of cutaneous inflammation (?), to which are superadded hyperæsthesia, and rarely motor disturbances.*

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* Bærensprung holds that the cause of Zoster lies in the nerves, the inflammation being transmitted by them to the skin (see above—Angioneurosis). Physiological facts have long placed beyond dispute that the cerebro-spinal nerve tracts, besides their sensory and motor, possess a third category of fibres, which pass into them from the sympathetic system; only to these last fibres, as the

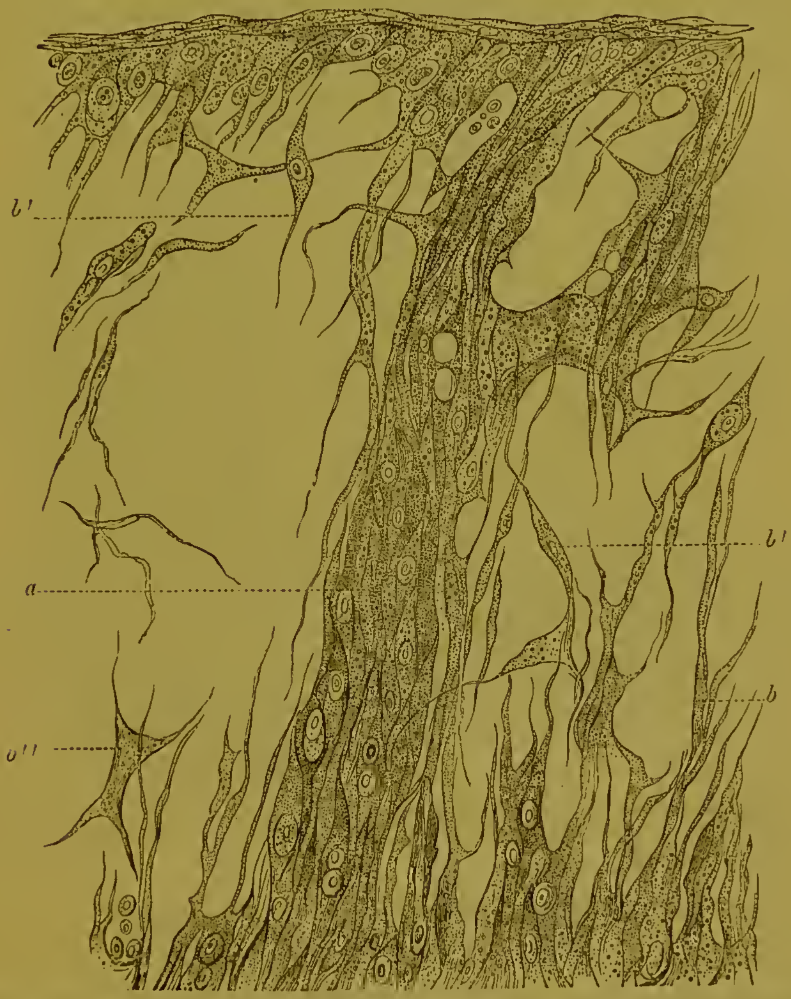
The desiccation of the eruption takes place in the order of its appearance, and on the spontaneous shedding of the crusts, cicatrices are in process of formation. In cases in which the efflorescence has been subjected to the irritation of ointments, plasters, or the friction of the clothes, inflammation with profuse suppuration sets in, causing considerable loss of substance and consequent formation of thick confluent crusts, the diagnosis being thus rendered obscure; the occurrence of the disease on one side and along the course of the nerves, however, affords reliable diagnostic information. These cases also are very painful and of long duration. The disease occurs in infancy (*Thomas* observed zoster in a child ten to fourteen months old), youth, and old age, most frequently between the ages of twelve and twenty-four; it is very rare in young children. The disease is more frequent in males. The season of the year would appear to have some influence, as we have observed, at particular times a large number of cases, whilst at others not a single case during long intervals. Erythema, purpura, and diseases of a similar character frequently appear at the same time as herpes.

Anatomy. According to Biesiadecki the vesicular and papular formation is similar to that in eczema. In the development of a pustule there is a marked increase of the cell elements within the papilla, which extend throughout the entire mucous layer and a part of the subcutaneous cellular tissue; the vessels of the papilla are distended with blood. From the papilla spindle-shaped cells (which undergo proliferation) extend into the corium, the compressed epithelial cells thus become separated by a layer of roundish cells, and form narrow rows (Leisten) perpendicular to the

essential instruments of trophical processes, we have here to direct attention. From all points at which a ganglionic mass is accumulated, such fibres pass into the nerve-bundles, and each individual ganglion would appear to have its own area,—its particular organs, which it has to supply with trophic nerve-fibres. Through this we are conducted to the posterior spinal nerves, the roots of which each possess a ganglion, and the spinal ganglia give us the key to the explanation of the appearances on the skin to which we have referred. The neuralgia, which so frequently accompanies Zoster, is explained by the transmission of the irritation and reflex action from the ganglion upon the corresponding posterior root. Zoster consequently depends upon a morbid state of the ganglionic system, or rather on an irritation, either of a spinal ganglion or of the Gasserian ganglion; nevertheless, the peripheral irritation of a nerve which possesses ganglionic fibres may cause a limited eruption of Zoster vesicles, and even the possibility of a simple reflected affection of the ganglia must be acknowledged. Zoster is to be classed amongst those diseases which are produced by sudden changes of temperature, as angina and rheumatism.

epidermis. Towards the centre of a pustule the cell-proliferation is more marked, and in the rete Malpighii foci of suppuration are formed, which are enclosed by a mesh-work consisting of the compressed epithelial cells (changed into horny lamellæ) of the middle and superficial mucous layer. The epithelia of the deeper mucous layer are involved in the proliferating process, being changedinto mother-cells, which frequently enclose several nuclei, and are situated at the base of the pustule, therefore over the flattened corium which is infiltrated with cells, but they sometimes extend into the mesh-work.

Fig. 12.

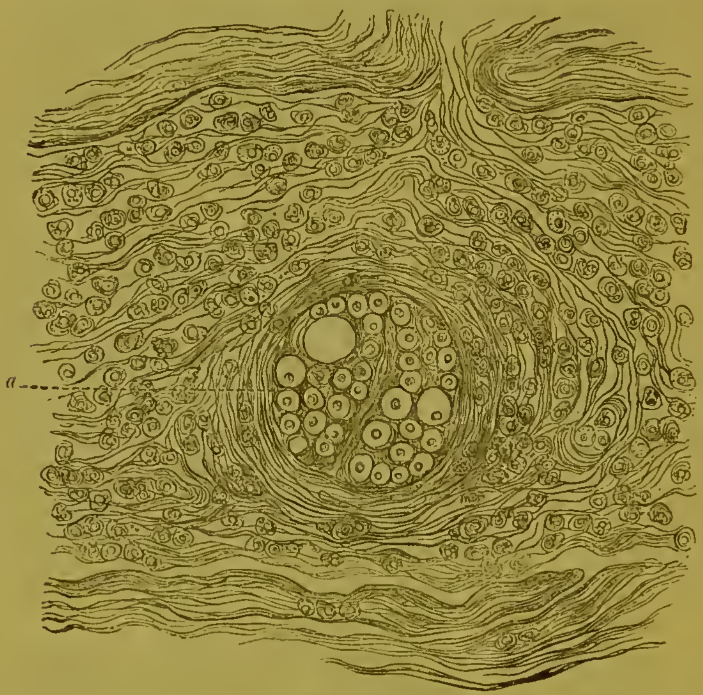


Bulla of Herpes Zoster (after *Haight.* Sitzungsb. der k. Akad., 1868). *a.* Thick strand formed of elongated spindle-shaped epithelial cells. *b.* Mesh-work consisting of spindle-shaped cells. *b'*, of cells with several prolongations. *b''* (Diam. 450).

The mesh-work traversing the pustule, is, therefore, formed of the separated and compressed epithelial cells of the middle and superficial mucous layers, and of the cells which compose the sudoriparous and sebaceous glands; both participate in the formation of the umbicle. The mesh-work (Fig. 12) is to be regarded as composed of the compressed spindle-shaped cells of the epidermis, and to a small extent of those of the deepest mucous layer. Around, and in the neurilemma there is distinct cell-proliferation in herpes zoster, similar to that which was earlier observed to exist around the nerve-trunks in neuroma and carcinoma. Further, Haight describes a liquified condition of the medullary-sheath of the nerve, and displacement of the axis cylinder.

Fig. 13.

(Drawing from a preparation by Dr. Haight.)



From the deeper layer of the corium in herpes zoster; densely compressed cellular tissue. *a.* Transverse section of a nerve with enlarged fibres, axis cylinder displaced; loose cellular tissue around nerve interspersed with pus-cells.

Treatment. In all varieties of herpes the expectant method of treatment is the best, consisting simply in protecting the eruption. In herpes zoster the friction of the clothes, which causes destruction of the vesicles, may be prevented by a suitable bandage, and the spontaneous desiccation is accelerated by the application of powdered starch. These precautionary measures acquire importance from the fact that irritating agencies, which destroy the vesicles and expose the corium, delay the healing process, and lead to the formation of cicatrices, which (probably by the tension to which they subject the peripheral nervous branches) frequently induce the most acute neuralgia. The method of painting with collodion, and the application of dressings with *Ol. hyoscyam* frequently afford good results. For the relief of the pain, *Emplastrum diabotani* (℥ss.), with *Extr. opii aquosi*, or with *pulvere laudani puri* (ʒi.); the entire quantity is spread on linen or leather, and applied to the affected part, being allowed to remain until the pain ceases, or until the eczema (which is thus sometimes artificially produced) necessitates its removal. In cases in which this method or the inunction with *extract belladonna* (5 to 30) is not successful, we must resort to the subcutaneous injection of morphii as the most effectual means of relieving the pain.

Morph. muriat. gr. x.
Aq. distill . ij.
Gutt. 5—10 pro injectione.

In some cases thermal springs may be serviceable (Gastein, Tüffer, Römerbad, Ragatz, Pfeffers).*

In the other forms of herpes the expectant method is also to be recommended, consisting especially in powdering with starch, cold lotions, and the separation of opposed cutaneous surfaces by means of charpie and linen.

2. MILIARIA (*Friesel, Sudamina*).

The term miliaria is applied to a general efflorescence of minute vesicles, which remain isolated, and are surrounded by a narrow red areola; on the contents becoming purulent, rapid desiccation of the vesicles ensues, pale-yellow scaly crusts being formed. Three varieties of miliaria are described:

1. *Miliaria rubra* occurs in the form of papules or vesicles of the size of a pin's head on a reddened base, only the summits of which contain serum.
2. *Miliaria alba*, the vesicles of which exhibit milky (puriform) contents, the epidermis being macerated.

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* E. Fenger (Copenhagen) has published his own experience, as well as that of others, in regard to abortive treatment of Zoster with collodion. In the first twenty-four hours of this treatment all the existing vesicles fall in, the redness and heat of the skin diminish; the pain, however, does not subside in all cases. Painting with collodion prevents the formation of new vesicles (?). Ulceration and gangrene are not induced by this method.

Bærensprung recommends simple or glycerine ointment, warm poultices, and in neuralgia, vesicants.

3. *Miliaria crystallina*, in which the contents of the vesicles are transparent, resembling drops of dew.

The last variety only can be properly described as miliaria, whilst the two first are to be regarded as *sudamina* (Hebra) ; M. crystallina appears in the course of febrile diseases, as puerperal fever, typhus, and acute rheumatism; also in emaciated and anæmic children, and in the course of angina.

Sudamina arise under the influence of high temperatures, by which excessive secretion of sweat, and consequent distension of the excretory ducts of the sweat glands are induced. In the hot months of summer, as also from the use of vapour baths, and in corpulent persons who perspire freely, sudamina are frequently observed over the entire cutaneous surface. In cases in which the skin is tender, and especially in children, from the application of warm poultices for the relief of some internal affection (as pneumonia), there is often seen an extreme development of miliaria alba, in which the vesicles have become confluent and the epidermis raised by puriform fluid in patches of the size of half-a-crown. The fluid contained in the vesicles is odourless, has a neutral or slightly alkaline reaction, and, by chemical analysis, is found to contain chloride of ammonium.

In regard to the mode of origin, some authors explain the condition by an inflammatory exudation between the epidermis and cutis ; others, by an accumulation of the sweat in the excretory ducts of the sweat-glands ; and others, by an accumulation of the sweat between the lamellæ of the epidermis : the latter would appear to be the correct view, and has recently been verified by *Haight.*

It therefore follows, from the preceding observations, that miliaria is not a disease *per se*, although it has been described as such in so many works, and accounts given of its epidemic form ; nor is "Migliaria" (of such frequent occurrence in Italy) to be regarded as an independent affection. These eruptions indeed are only associated with febrile diseases, the course of which is accompanied by profuse perspiration, or are produced by covering the skin too warmly. The term sudamina is applicable to all those affections which have been described as miliaria. Hebra, on the other hand, designates by *miliaria*, the skin affections associated with typhus, puerperal fever, and such-like. In typhus, miliaria occur on the trunk and extremities ; in puerperal fever, on the abdomen and thighs, as well as frequently on the breast and neck ; also in acute rheumatism, scarlet fever, and small-pox. The efflorescence of miliaria occurs frequently enough as the result of pyæmia, but this would seem to be a disease *sui generis.*

Three cases in children have come under my observation in which, after a premonitory feverish stage of two days, a vesicular efflorescence appeared on the face, the extensor surfaces of the extremities, and also scattered over the trunk. At the same time there was observed redness and swelling of the mucous membrane of the soft palate, pharynx, and tonsils. After an eruptive stage of four or five days, during which the feverish symptoms had disappeared, the vesicles dried up, and on the parts where they were seated superficial desquamation occurred. In all three cases, relapses followed in from a few months to a year; the reddening which precedes the eruption of vesicles might, during an epidemic of scarlatina, lead to a diagnosis of that disease.

The *treatment* of sudamina is purely local, regulation of the temperature and powdering with starch, being sufficient to produce the disappearance of the efflorescence. In many cases, general eczema becomes developed, the description of which we reserve for the next chapter. Miliaria crystallina, as a symptomatic affection, does not require any special local treatment.

3. ECZEMA. (*Nässende Flechte*).

Eczema is a disease which appears primarily in the form of vesicles* papules or pustules, accompanied with more or less marked œdema, and is characterized in a later stage by the formation of crusts, scales, or infiltrations on a reddened, moist, or dry surface. Every form of the disease is accompanied with severe itching. The various stages of eczema are distinguished according to the form of efflorescence, as follows:—

Eczema papulosum.
,, *vesiculosum.*
,, *pustulosum.*
,, *rubrum.*
,, *impetiginosum.*
,, *squamosum.*

The first forms are therefore *primary*, the last *terminal* stages.†

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* As the disease appears most frequently in this form (*vesicular*) we have thus placed it.

† Tilbury Fox (Lancet, 1868, II. 21, 22) is opposed to this division of eczema; he regards the disease as analogous to catarrhal inflammation of mucous membranes, whilst he considers lichen as a plastic impetigo, and ecthyma as a suppurative inflammation.

The terms used by different authors, as *tinea, porrigo, crusta lactea, serpiginosa, serpigo,* and *impetigo,* are simply varieties of eczema, according to its stage and situation.

Eczema is either *acute* or *chronic.* The acute forms of the disease occur chiefly on the face, genitals, hands, and feet, sometimes however on the entire cutaneous surface. The eruption is preceded by chilliness along the back or by other febrile symptoms, and the eczematous part is reddened, swollen, and covered with vesicles ; these burst and exude a viscid gummy fluid, which dries up into crusts, on the removal of which the skin appears at first moist, and afterwards dry, reddened and covered with white scales (*pityriasis rubra*). When affected with acute eczema, the face is reddened and swollen, and the eye-lids œdematous; the exudation is situate rather in the deeper than in the superficial layers of the skin, the face therefore presents an irregularly swollen aspect, without the formation of many vesicles or papules. We observe similar phenomena in eczema of the genitals, the scrotum presenting the moist form of the disease, and the prepuce the œdematous condition. In acute eczema of the hands and feet there is also an eruption of vesicles, papules, and pustules. The general forms of acute eczema present varieties according to the seat of the disease, the vesicular and papular formation, however, being predominant. The chronic forms of eczema occur much more frequently than the acute, and as nearly every part of the surface may be thus affected, we shall treat of them in the order of occurrence. We may first however describe more precisely the origin of the several varieties. As before mentioned, eczema occurs in the form of papules, but most frequently in that of vesicles; the former desiccate in scales and crusts, or develope into vesicles; the latter burst and exude a viscid, gummy fluid, which being rapidly dried up by the action of the air, forms crusts, and the underlying skin is reddened, swollen, and moist at the early stage of the disease, and later, dry and covered with scales. In another form of eczema the exudation is accumulated not in the superficial but in the deeper layer of the skin, thereby producing œdematous swelling.

Eczema of the Scalp (*Eczema capitis Tinea capitis mucosa, achorosa, lymphatica),* occurs most frequently in the form of *E. rubrum* and *impetiginosum.* As the hairy scalp is the seat of large and numerous sebaceous glands, the secretion when mingled with an eczematous exudation, forms a yellowish, rather than viscid fluid, which in persons with long hair, who do not attend to cleanliness, undergoes decomposition, and absorbs from the surroundings, dust as well as the germs of vegetable and animal parasites, which here find abundant material in the decaying masses for their further development. The hairs become matted together, producing the condition called *Plica polonica.* In persons, however, who attend to cleanliness and remove the accumulated masses of exudation, the morbid process gradually subsides, crusts being formed, which are gradually thrown off. Eczema of the scalp extends to the surrounding parts, as the forehead and external part of the ear, from which latter situation the disease extends to the external auditory canal and to the neck. This spreading character of eczema is important in the diagnosis between this disease and seborrhœa, psoriasis, favus, and syphilis. In acute eczema of the scalp, swelling and suppuration of the cervical glands rarely takes place, and this only in children when irritant remedies have been employed in the treatment of eczema.

The eczematous condition arises on the external ear either by the extension of the disease from the scalp and face, or spontaneously, both ears being usually affected; the lobes are the favourite seat of the disease. From this situation eczema extends to the external auditory canal, which thus becomes contracted, and difficulty of hearing ensues, which may continue even for years, especially in cases in which pachydermia is developed. Between the external ear and the posterior portion of the scalp painful fissures are frequently formed.

Eczema of the face. E. faciei (Porrigo larvalis, Crusta lactea, Mellitagra flavescens). The disease may attack either the entire face or only a part of it, as the forehead, eye-lids, lips, nose, chin, and parts covered with hair. Eczema is rarely limited to the forehead except when locally produced, as by the pressure of a hat; usually, however, it extends from the scalp or cheeks. On the eye-lids, the disease appears either in the form of a œdematous infiltration, or of moist and excoriated vesicles; there is observed at the same time œdema and redness of the conjunctiva (*conjunctivitis*). On the alæ of the nose, at the point of junction of the skin with the mucous membrane, eczematous affections frequently occur, and extend also to the mucous membrane; the nose thus becomes enlarged, the surface reddened, and the passage of the air through the nostrils impeded. Eczema also arises spontaneously on the nasal mucous membrane, which thus becomes covered with crusts, the latter remaining adherent sometimes even for years, giving rise to periodical recurrence of erysipelas of the face, as also to chronic œdema of the eye-lids. The affection occurs frequently on the lips, in the forms of *eczema rubrum*, *impetiginosum* and *squamosum*, and extends to the mucous membrane, which becomes covered with crusts, presenting deep fissures; the parts become enlarged (even to four or five times their normal size) chiefly the upper lip, although externally the skin may appeár healthy. These forms of eczema are extremely obstinate, from the constant movement to which the parts are subjected, as well as from the difficulty of applying remedies.

Eczema barbæ. Eczema affecting the hairy parts of the face, is an extremely frequent and obstinate form of the disease. The parts involved become reddened, moist, and swollen, or, when the affection has lasted for some time, covered with crusts, or there occur small flat pustules at the points penetrated by the hairs. On pulling out one of the hairs, we observe the root swollen, loosened, and saturated with pus. In these cases, therefore, the phenomena completely resemble those of *sycosis*, from which this variety of eczema is only distinguished by its extension to the surrounding parts, as the cheeks and neck, whilst sycosis is always limited to the hairy parts. The forms of eczema on the chin and neck present no special characteristics, and rarely occur except in conjunction with the affection on other parts.

The variety of eczema affecting the nipples is that known as *E. rubrum* and *impetiginosum*; both nipples are usually attacked, being swollen, reddened, and deprived of epidermis. The affection which chiefly occurs during the puerperal state and in primiparæ, is extremely obstinate and painful, for whenever the child takes the breast, the inflamed nipple is subjected to fresh irritation, and the swelling thus increases; cases not unfrequently occur in which suppurative mastitis arises, necessitating discontinuance of suckling, otherwise protracted disease of the mammary gland may ensue. Similar forms of eczema may arise, however, in both sexes without such causes, the nipple forming the centre of the eczematous process (*E. impetiginosum*).

The disease occurs also in the form of *E. rubrum* on the navel, which, with its vicinity, appears moist and reddened.

Eczema of the genitals. This affection occurs frequently in the male, the penis and scrotum being affected together, or either separately; the most frequent forms are *E. rubrum* and *impetiginosum*. The penis becomes enlarged, chiefly from œdematous swelling of the prepuce, as the result of which more or less phimosis or paraphimosis is produced; the affection in rare cases, becomes chronic in this situation, causing elephantiasis of the prepuce. Eczema of the scrotum causes swelling, moistening of the surface, and deepening of the lines and folds. On the long duration of the disease, thickening of the entire integument of the scrotum occurs, as also—elephantiasis. Eczema of the genitals is one of the most disagreeable forms of the disease, from the severe itching which accompanies it, as well as from its obstinate character.

Eczema of the female genitals involves chiefly the labia majora, from which it extends in the form of *E. rubrum* either forwards and upwards, or downwards along the inner surface of the thigh; backwards, towards the perinæum and anus, or inwards to the labia minora, and even to the vaginal mucous membrane; on these situations it is accompanied with severe itching. This affection occurs chiefly in corpulent subjects.

Eczema of the perinæum and anus. The perinæum and parts around the anus are frequently the seat of obstinate forms of eczema, which are chiefly due to the friction of the opposed cutaneous surfaces, and which, in addition to the effects of the decaying perspiratory secretion (abundant even in the normal condition) produces irritation and inflammation of the skin. When this condition is neglected by the patient, gradual infiltration of the skin takes place, as the result of which the folds around the anus become considerably thickened, and painful fissures are formed, which are subjected to contamination and irritation during defæcation. This eczematous affection extends also to the mucous membrane of the anus, and the itching is thus greatly increased. We may here allude to those morbid changes, which arise in the skin from the intimate contact or friction of two opposed surfaces; in children, and less frequently in adults, hyperæmia and congestion are thus primarily produced. From the protracted effects of such irritation, an inflammatory and infiltrated condition of the skin is produced, and when the cutis is naturally tender, ulceration and gangrene may even ensue. In children these morbid changes appear in the fossa supra-clavicularis, in the folds between the shoulder and neck, more frequently in the inguinal region, in the vicinity of the anus and genitals, and also along the entire inner surface of the lower extremities; these conditions are especially frequent in infants who have been kept for too long a period in swaddling clothes. Whilst ulceration and gangrene only occur in wasted children, the erythematous and eczematous lesions appear also in those who are well nourished. In adults similar phenomena occur in the axilla, on the abdominal wall (in corpulent subjects), as well as on the genitals and around the anus.

Eczema marginatum. From the above mentioned causes, as well as from the contact of the scrotum with the inner surface of the thigh, the corresponding area of skin on the latter situation becomes the seat of hyperæmia, later of inflammation with desquamation, and lastly, of infiltration. This form of eczema, however, does not remain limited to this situation, spreading from the periphery (whilst the centre heals) in the form of papules and vesicles upwards towards the abdomen, downwards along the thigh, as well as backwards towards the anus; it is obvious that the scrotum also is affected. Another mode of extension of eczema marginatum is by isolated circles (limited peripherally by small papules which enlarge and coalesce), and as the margins disappear there remain variously curved lines, leaving a central pigmented region of skin. Köbner was the first who attributed the origin of this disease to a *fungus*, which may be transmitted, resembling *Trichophyton tonsurans;* my investigations confirm these of Köbner, as in several cases, I have observed the existence of fungi similar to those of *H. tonsurans.* When there is a considerable amount of infiltration and papular formation, the discovery of fungi is more difficult, probably from the circumstance that in such cases the fungi have already been destroyed. In treating of parasitic affections we shall refer to this disease.

Eczema of the extremities. In children, as well as in adults, certain obstinate forms of eczema (chiefly *E. rubrum* and *squamosum*) occur on the flexor surfaces of the joints, especially the knee-joint, and from the frequent movement of these parts, painful fissures are formed, the skin being considerably thickened and infiltrated; both knee joints are usually attacked. The forms of eczema which most frequently occur on the legs are *E. vesiculosum* and *rubrum,* as well as all the later varieties of the disease; the symmetrical character of eczema is observed here, as on other parts of the body. This affection is mostly caused by varicose veins, but also occurs spontaneously. Eczema of the feet usually appears on the dorsal surface, and is due to the pressure and friction of the boots. Eczematous affections of the hands are of frequent occurrence, and present the most varied forms of the disease in its acute and chronic conditions; its frequency on this situation is to be attributed to the local action of numerous injurious substances, as also to diseases of internal organs. The morbid process is protracted by the movement of the fingers, as the result of which, thickening and deep fissuring of the skin takes place, causing great pain in every movement, and lastly, producing stiffness of the fingers. The obstinate character of these forms of eczema is partly due to the circumstance that the dense epidermis impedes the eruption of vesicles, so that the disease runs its course in successive sub-acute attacks of an inflammatory character. On the fore and upper arm, eczema also appears frequently, and is usually traumatic in its origin.

Etiology. Eczematous affections are *idiopathic* or *symptomatic*; the former arise from direct irritation of the skin, as from the action of irritant ointments, fluids, and oils, the prolonged influence of extreme degrees of temperature, or mechanical injuries directly affecting the skin. Eczema may be produced by the inunction of *Ung. Autenriethi, Ol. Crotonis, Daphne Mezereum, Ung. Hydrargyri,* and sulphur, iodine, and potash soap. Mechanical injuries of the skin are produced especially by the finger nails, scratching alone being sufficient to cause eczema; hence we frequently observe eczema arising from itching skin affections, as scabies and prurigo, as well as from the presence of pediculi vestimontorum. The forms of eczema caused by the pressure of clothes, trusses, belts, stays, hats, boots, etc. belong to the same category. It is difficult to define the limits of temperature within which eczema is induced. In general it may be stated that persons with a delicate and slightly pigmented skin are more liable to eczema than those of darker complexion. From excessive heat of the sun, or from vapour baths, sudamina frequently arise, and these agencies if protracted and repeated may easily produce general eczema.

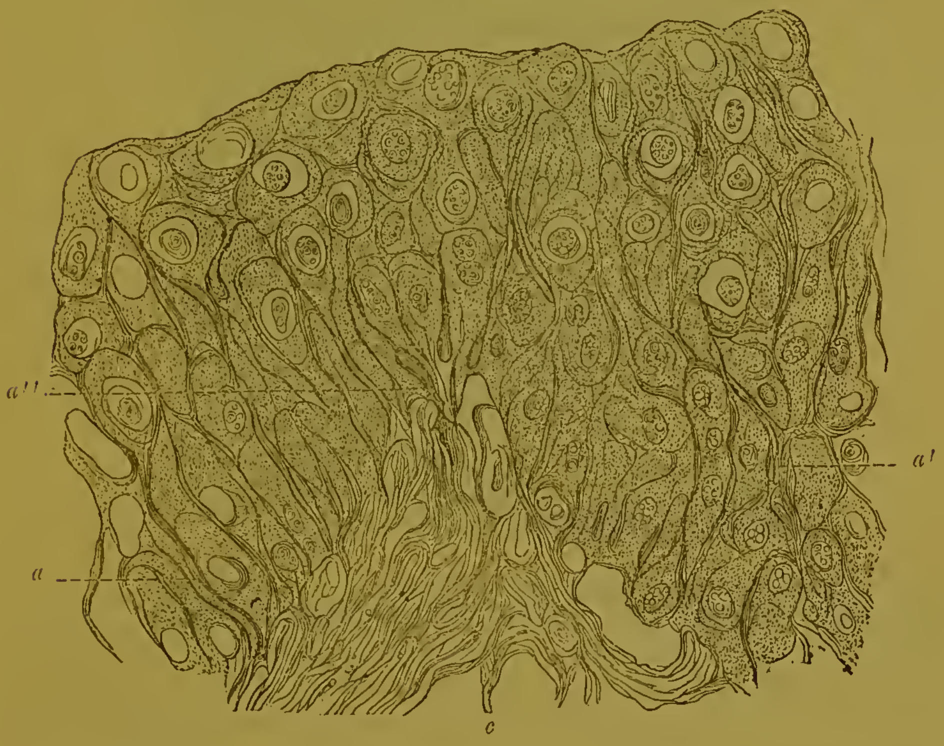
The origin of the *symptomatic* forms of eczema is more obscure, and we only know that they somctimes occur as the result of internal diseases: to this category belong those eczematous affections dependent upon dyspepsia, which occur chiefly on the face and hands, as also those arising from disorders of menstruation; from their frequent recurrence these forms of eczema are extremely obstinate. Eczema occuring in chlorotic girls, disappears on the cure of the condition to which it is due. The relation subsisting between eczema and the rachitic and strumous diatheses is usually exaggerated. As the result of my statistics, of 308 children affected with eczema, only 30 were rachitic and 70 strumous; therefore amongst 100 cases 9·7 were rachitic and 22·7 strumous. Again, more than 3000 strumous and rachitic patients came under my observation, amongst whom not a single case of eczema occurred; we cannot therefore conclude that any great relation subsists between these two diatheses and eczema: further, the local treatment of eczema is successful although these constitutional conditions exist. It is evident that only a small fraction of the cases of eczema occur in strumo-rachitic subjects, the majority being independent of any constitutional taint. The remaining causes of eczema enumerated by different authors, as temperaments and dyscrasiæ have not been proved; and it is better to confess at once that many forms of eczema occur, the origin of which is completely obscure. Eczema is not contagious, although cases occur in which the profuse secretion communicates the disease to parts with which it is brought into close contact, thus eczema on the buttocks of a child is communicated to the forearm of the nurse. It may here be mentioned that the hereditary character of eczema asserted by Veiel, is confirmed by my experience only in so far that in certain families a predisposition to the disease exists, and that in such cases recurrence frequently takes place.

Morbid Anatomy. Eczema in its various stages may be artificially produced on the skin of animals as well as on that of the human subject by the inunction of croton oil. For experimental purposes, I selected a white rabbit, the ear of the living animal having been treated by inunction for 10 or 15 minutes, was placed under a dissecting microscope (Plössel's) and the changes observed for several hours, as far as was possible with such small magnifying power. The most striking phenomena were at first rhythmical contraction of the vessels, which now appeared loaded with, now emptied of blood, and at a later stage dilated, until finally the stasis became permanent; the lobe of the ear which was at first transparent became opaque, hot, and swollen, and after a few hours showed numerous blebs with serous contents. After 48 hours the animal was killed, and the tissues (which had been subjected to experiment) were found to be saturated with serous fluid and abundantly infiltrated with cells. I have not further continued these experiments.

Biesiadecki (Sitzungsber d. k. Akad. Wien, 1867) thus describes the formation of papules and vesicles: at circumscribed parts, the papillæ are lengthened and enlarged by cell infiltration and serous fluid. The connective-tissue corpuscles of the papillæ are distinguished by their size and succulence, as also by their increased number. The mucous layer (Fig. 14) is traversed by numerous spindle-shaped cells, which are partly embedded in the papillæ, partly between (and separating) the deepest cells of the mucous layer (*a''*), and extend even to the epidermis. As the mucous layer is thus traversed a dense mesh-work is frequently formed by these cells, in the interstices of which lie the somewhat enlarged epithelial cells, the protoplasm of which appears slightly nucleated. The eczematous papule is thus formed by a circumscribed infiltration of the papillæ and mucous layer.

The new cell-growth in the papilla increasing, the superficial cells of the mucous layers become enlarged and ruptured, the epidermis being thus elevated a vesicle is formed. In this case the spindle-shaped cells are seen to be still more abundant, serving as sap channels (Saftkanäle) by which probably nutritive material is conducted to the mucous layer. (?) In acute eczema these cells are also seen in great numbers, forming a dense mesh-work. The increase of these cells in the mucous layer determines a corresponding increase of the fluid saturating the papillæ, which is sometimes so abundant as to raise the epidermis in the form of a bulla; on the removal of the epidermis the fluid trickles out

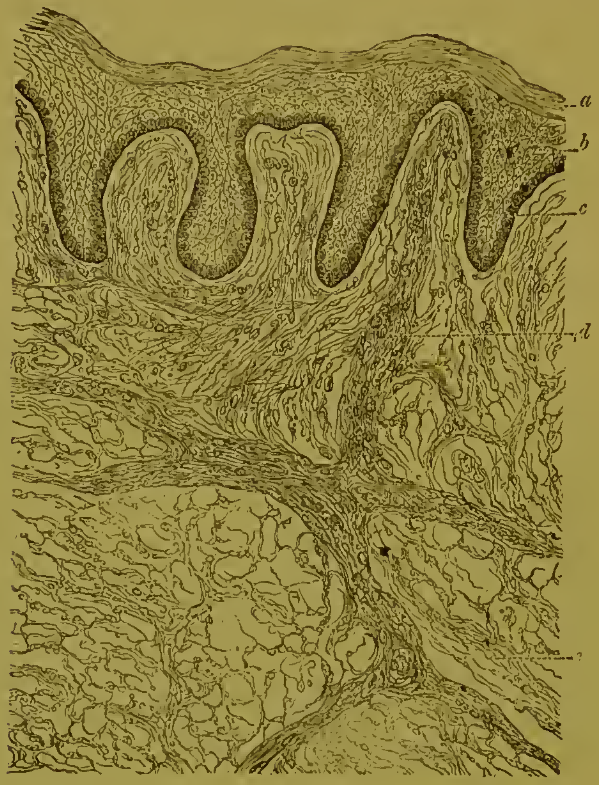
Fig. 14.



Eczematous papule (*after Biesiadecki*). *a*. Spindle-shaped cells, which numerously traverse the mucous layer. *a'* with several nuclei. *a''* half remaining in the corium. *c*. Papilla.

(weeping eczema). This condition explains the mode in which an exudation into the papillæ finds its way to the surface through the mucous layer.*

Fig. 15.



Section of infiltrated part from chronic eczema. *a.* Epidermis. *b.* Rete Malpighii. *c.* Pigmented cells and enlarged papillæ. *d.* Cell-growth around vessels. *e.* Diffuse cell-infiltration.

The anatomical changes vary according to the duration of eczema. The viscid exudation presents no microscopic differences from ordinary serum.

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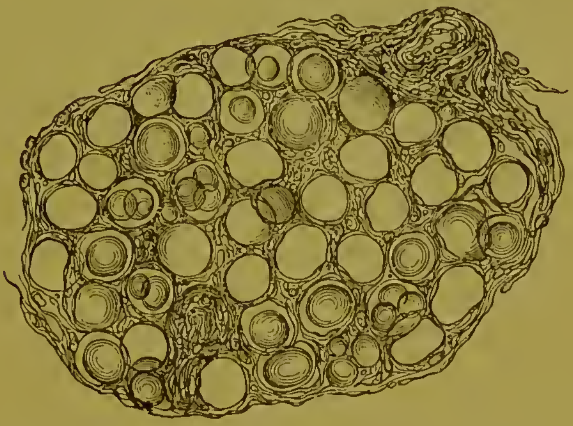
* In regard to the origin of the proliferation, Cohnheim and Recklinghausen especially have given experimental results. In the mesentery of the living frog, Cohnheim observed the passage of blood-corpuscles through the capillary walls; the greater part of the cell-growth consists therefore of escaped white blood corpuscles. Recklinghausen on the other hand, observed cell-proliferation in a cornea (*without* blood-vessels) which had been excised and preserved living during 24 hours by oxygen and moisture; therefore this cell-growth may also originate in other elements of the tissues. Pagenstecher (Akad d. Wissensch., 1868) shows that there is proliferation of these spindle-cells in all morbid conditions in which there is increased formation of epidermis, as in cicatrices, psoriasis, chronic eczema, and the hypertrophic skin around ulcerating epithelial cancer; the spindle-cells (distinguished from the epithelial cells of the skin by

In acute eczema, the follicle, papillary body, and superficial layers of the corium are swollen; but this swelling generally diminishes. In chronic eczema on the other hand, the skin is considerably thickened, the lines and furrows become deepened, and the papillæ so much enlarged that they are visible to the naked eye. The longer the duration of the disease, the larger become the papillæ and the more marked the cell infiltration in the corium, which sometimes extends to the deepest layers, (Fig. 15) so that even in the panniculus adiposus, cell proliferation is observed between the separate fat cells and around the capillary vessels.

Fig 16.



Cell infiltration around separate fat cells of penniculus adiposus in chronic eczema.

Prognosis. Eczema belongs to the curable skin affections, although relapses occur in many cases, the disease returning once or twice or several times during a year, and this happens especially in the symptomatic varieties. The longer the duration of eczema, the simpler the treatment becomes, for we have then to deal

their irregular, stellate, spindle, or other shape, as also by their minuteness and lustre) are those which Biesiadecki first discovered in the normal skin, and found increased in condyloma, acute eczema, and herpes zoster. These cells spontaneously extend from the corium into the stratum mucosum, as in some cases, we find the same structures in the above mentioned morbid processes, both being tinged with the colouring matter of the blood. The migrating cells are not destroyed in the rete Malpighii, do not form pus, and do not extend further towards the surface; hence the author arrives at his last and most important conclusion, viz., first, that as positive observation has not shown division of the epithelial cells, and as he can demonstrate transition forms of migrating into epithelial cells, that the migrating become *epithelial* cells. Later researches by Oser have proved that there is endogenous growth in the epithelial cells.

rather with the products of the disease than with the morbid process itself. The obstinacy of eczema varies according to its seat, thus when the affection occurs on hairy parts, or on the hands, eye-lids, and lips, it is more easily cured than when located on the arms, thighs, and legs. Eczema when due to the occupation, as in the case of laundresses, or those who are exposed to heat (stokers, etc.), returns on the renewed action of these injurious agencies; in such cases the occupation must be discontinued until fresh layers of dense epidermis have been formed on the affected parts.

Treatment. The different views which have been held regarding the causes of eczema have variously influenced the methods of treatment; the local treatment particularly was long in disrepute, chiefly in the case of children,—from the hypothesis maintained by many authors, that by the local cure of eczema, a beneficial deposition from the system was obstructed, internal diseases, as hydrocephalus, meningitis, pleuritic exudation, bronchitis, etc. being thereby induced. In opposition to this theory, the facts of experience may be adduced, for we have had ample opportunities of observing the disease in children, and although we have adopted only local treatment, we have never seen such evil results. The proportion in which hydrocephalus, meningitis, and croup stand to eczema is so infinitesimal that amongst 13,000 children suffering from this affection, only 10 had hydrocephalus, and the same number croup. We observed on the other hand, children whose health had been impaired by the discharges and the sleepless nights, regain strength and weight rapidly on the cure of the eczema. We do not therefore fear "metastasis" of eczema, and never employ internal remedies, except in cases in which the affection is evidently dependent upon diseases of the internal organs.

In the treatment of eczema we do not prescribe antimony, mercury, or iodide of potassium, or venesection and purgatives; in chlorotic subjects, however, we administer ferruginous remedies, in those who are ill-nourished, meat diet, and in cases of a certain type, in which each outbreak is preceded by febrile disturbance, quinine; in obstinate cases we give also internally arsenic or carbolic acid.

If there are excoriations or ulcers on the os uteri, or if leucorrhœa exists, these conditions must be treated.

When the relapses occur in consequence of the confined mode of life of the patient, exercise in the open air is to be recommended; when eczema is dependent upon digestive disorders, mineral waters may be useful (Karlsbad and Marienbad); in anæmia and derangements of the sexual system, ferruginous springs (Franzenbad, Pyrawarth, Pyrmont, etc).*

The local treatment is much more important, however, and to Hebra is to be attributed the merit of having established this on rational grounds. It comprises the following remedial agents:—*Water* at different temperatures is used as a solvent for various medicinal agents. In eczema *warm* water is seldom employed except in the form of baths; or as tar, soda (1 *lb. pro balneo*) or corrosive sublimate baths; *cold* water is employed in the form of bandages, douches, or as the so-called Priessnitz's "cold-water-cure." In acute eczema water is employed in bandages (soft rain or distilled water being most suitable); as hard water contains various salts, it does more harm than good when applied to a delicate skin, but if only hard water can be obtained, it may be used after being freed from its salts by boiling and allowing it to cool. Water is employed as a rain-douche, and care should be taken not to allow the water to fall on the affected part from a greater height than two feet, as powerful douches may easily produce inflammation of the skin, as well as boils. As a solvent, water is used for various astringents, as alum, acetate of zinc, sulphate of copper, caustic potash, and corrosive sublimate, the concentration being modified as desired; the usual strength employed is 1-3 gr. to the ounce of water. In acute eczema these solutions are used in conjunction with cold bandages, a piece of linen being first soaked in the solution, applied to the part and covered with a cold bandage. The "cold-water-cure" is only suitable in acute general eczema. When circumstances do not admit of the patient's residence in a hydropathic establishment, the method may be adopted in private as follows: on the mattress of a bed, a large piece of wax-cloth is first laid, on which two folded sheets are placed transversely, and above this one or two blankets; lastly, two wet linen sheets (and also a urinal, conveniently placed); the douche apparatus is placed close to the bed, and after the patient has been douched, he is rolled up in the wet sheets and covered with blankets tightly bound round the body; a covering is then thrown over all. The patient soon experiences a pleasant feeling of warmth, and slowly perspires, the itching and burning at the same time greatly subsiding. This process should be repeated at least four times during 24 hours. The room should be moderately warm, and after the use of the douche, the patient should move about a little before lying down. Water is also used for concentrated solutions, especially of caustic potash in the formula. *R. Potass. caust., Aq. dist. aa part. æqual.* This solution is applied at least three times a week with a charpie-brush, and immediately after thus painting the part, the potash is saponified with luke-warm water. The great pain produced by this method is lessened by the application of cold bandages, and completely subsides within a quarter of an hour. In cases in which eczema has proved most obstinate—lasting even for years,—and when the skin is much infiltrated, this method is successful; the vesicles, which although not numerous are still accompanied with most severe itching, are destroyed the moment that the solution comes into contact with them, and the itching entirely ceases. In eczema we do not employ any other caustic agent, as nitrate of silver, or the concentrated acids (sulphuric, nitric, or chromic); I employ only the *collodion-sublimate* (*Hydrarg. sublim. corros.* ʒi. *Aether. sulph.* ʒii. *Collodii* ℥ss.) along with the concentrated potash solution in obstinate forms of eczema with good results; the layer of collodion which remains on the cauterised part prevents the access of the atmospheric air, thus lessening the burning pain. This solution is also applied by means of a charpie-brush; during its application there is no pain, but after half-an-hour it is usually rather severe.

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* Wilson, who attributes the occurrence of eczema during infancy to an unhealthy condition of the milk and to defective assimilation, by which the nutrition becomes impaired, mentions the following indications:—*elimination*, *restoration of power*, and *alleviation of local distress*; with the view of fulfilling these indications he gives calomel to promote the action of the intestinal canal, arsenic and iron as tonics (Vin. ferri. Syrup. tolutani a.a. ʒss.; Liquor. potass. arsenic. gutt. XXXII. Aq. Anethi ℥i. ʒss. ter die.); and as a local application, zinc ointment.

In the treatment of eczema oleaginous substances are employed with the view of removing the crusts, and of excluding the access of the air from the affected part, so as to prevent the drying up of the exudation at each successive outbreak; by this means the cure is effected in cases where the skin is not greatly infiltrated. The substances most commonly used are cod liver oil, almond or olive oil, or *Sebum ovile, unguent. simplex, spermaceti, partem unam. cum. ol. olivarum q. s. ut. f. ung. molle;* also crême céleste, cold cream, or hog's lard.

In applying these substances it is necessary to keep as large a quantity as possible in contact with the skin. In combination with these oily substances, various astringents are employed, as *oxid. zinci, plumb. carb.*, or *plumb. acet.* and *hydrarg. præcip. alb.* (ʒj. *ad* ℥j.) ; or *hydrarg. præc. ruber* (*gr.* 1. *ad* ʒj.) These mild astringents, however, are only suited for slight cases of eczema. Zinc is used as an ointment by Wilson in the following formula :—

℞. Adipis præp. ℥vi.
Gummi Benzoini pulv. ʒj.
Liquefac cum leni calore per horas XXIV. in vase clauso,
dein cola per linteum, et adde
Oxidi Zinci purificati ℥j.
Misce bene et per linteum exprime.

This ointment is well-adapted for cases of eczema in which the infiltration is not considerable. Of all ointments, however, the *Unguent. diachyli albi* (first used by Hebra) is the most important; this is the preparation that has been so long employed for the cure of profuse perspiration of the feet ; it consists of equal parts of simple diachylon plaster and linseed oil, or more correctly in the following formula :—

℞. Olei Oliv. ℥xv.
Lithargyri ℥iij. ʒvi.
Coque. Dein adde
Olei lavanduli ʒij.
M. ft. ung.

This ointment is spread over a piece of linen to the thickness of the back of a knife, and is changed twice in 24 hours ; it is suitable in nearly every stage of eczema ; and indeed it is indispensable in the treatment of cutaneous diseases in general ; on parts covered with hair, however, this ointment is not to be applied, as from its consistence it produces matting of the hair. It may be employed either alone or combined with an equal quantity of Wilson's ointment or—in the case of great infiltration—with an equal quantity of *Emplast. mercurial.*, or as a combination of two parts of the ointment to one part of tar.

Borax is used simply in solution, or in combination with alum, or in the form of an ointment ; in solution it is especially suitable for moist eczema of the scalp (*Boracis venet, Alum crudi ad* ʒj., *Glycerini* ℥ij.) ; this solution is to be painted on the part twice daily. Borax ointment (*Borac. venet.* ʒj. *Solve c. s. q. Glycerin. Sebi Ovilis, Ceræ flave a.a.* ℥*ss. Ol. Oliv. q. s. ut. f. ung. molle.*) ; this is employed in the same manner as diachylon ointment.

Potash soap (*Sapo-viridis*) is applied either by inunction or in bandages ; it may be rubbed in twice daily, by means of flannel ; after each inunction the soap is thoroughly washed off with warm water, and the affected part covered with cold bandages. The eczematous vesicles are thus completely destroyed, while the surrounding healthy skin remains unaffected. This process of rubbing in the soap is continued until the skin becomes dry and lustrous. Soft soap spread upon bandages of flannel or linen is only applied with advantage in cases of eczema accompanied with considerable infiltration, in order to render the disease acute, and thus to arrest further exudation. Potash soap in solution (*Spirit. saponatus alcalinus*) is especially adapted for eczema of the scalp.

Tar. In the chapter on psoriasis we shall describe fully the use of this remedial agent, which is also valuable in the treatment of eczema, especially of *E. squamosum.* In the other forms of eczema (with the exception of that affecting the scalp) as *E. rubrum* and *impetiginosum*, the application of tar is too painful, and usually increases the inflammatory process; in eczema of the scalp, tar is useful even in the moist form of the affection. Several varieties of tar are employed as *oleum fagi. ol. cadini* and *ol. rusci;* the thickest form is the best, as it remains longer in contact with the affected skin, and prevents the access of the air. For parts covered with hair, an alcoholic solution of tar is used, this being less liable to produce matting of the hair. This admixture is also suitable for accelerating the drying of the tar, as is especially advantageous in the ambulance; the use of powdered starch answers the same purpose. In recent times *carbolic acid* has been used instead of tar, either in solution or in the form of ointment. (*Acidi carbol.* ℈j. *Solve s. q. Glycerini unguent. emoll.* ʒij., or *Acidi carbol.* ℈ij. *Alcohol., Glycerini a.a.* ʒj. *Aq. destill.* ℥vi.) The ointment is suitable for the above mentioned cases, and the solution is especially adapted for squamous eczema of the hairy scalp.

Eczema is also successfully treated with a modified form of *Wilkinson's ointment* (see Scabies).

Powders. Those most used are: *Amylum pur., Pulv. Alum. plumosi, Pulv. Oxidi Zinci, Talc. Venet., Lap. Baptist., Semen Lycopodii;* these are either used separately or in combination as follows: (*Amyli puri* ʒj. *Oxidi Zinci* ℈j. or *Amyli puri* ℥iij. *Pulv. Ireos florent., Alum. plumosi a.a.* ʒij.)

Pressure. This forms an important part of the treatment of infiltrated eczema; it can only be applied, of course, on parts situated over bones; thus on the legs and feet the cure of eczema is accelerated by applying bandages (on which ointments or other remedies have been spread) tightly around the affected limb, and in eczema of the hands, strips of adhesive plaster. The cure of eczematous infiltration of the upper lip is often only to be accomplished by pressure, effected by placing a piece of cork-wood between the dental arch and the upper lip, as also that of chronic infiltration of the prepuce, by introducing a metallic catheter into the urethra.*

Although many other remedies and methods of treatment are proposed, we prefer to mention only those which we have actually tried and found efficacious. It rarely happens that we can cure an eczema by one method, for in the different stages of the disease our remedies must be changed or combined with others: thus, tar frequently acts better when combined with diachylon ointment, or in subjecting the part thus treated to the action of warm water for several hours. In general the choice of remedies will depend upon the age and circumstances of the patient (whether he is to follow his occupation or devote himself to the cure of his malady), as also on the locality of the disease (whether on covered parts of the body or on the face and hands). In reference to the method of treatment we may instance a few cases: thus, in treating an eczema impetiginosum of the scalp and external ears, we have first to remove the crusts by means of oily applications; if the underlying skin is dry and slightly infiltrated, the cure may be effected simply by the inunction of some of the enumerated ointments: if the infiltration is considerable, then we employ preparations of tar. On the removal of the crusts we may find the skin moist and reddened, in which case our remedies consist in repeated use of the rain douche, cold water bandages, and inunction with potash soap; if on the subsidence of the swelling the skin is still somewhat moist, we may, in adults, employ tar in this stage; in children, however, on account of the more delicate skin, this remedy is unsuitable, as it may easily produce swelling of the glands, and even suppuration. When the eczema is located in the external auditory canal we may inject some of the various astringents; in order to apply an ointment to the entire canal we introduce a compressed sponge-tent (or *Laminaria digitata*) smeared with ointment. In the case of eczema of the nares, astringents may be applied in the form of *suppositories* (*Butyr. Cacao gr.* xvi., *Oxid. Zinci. gr.* ii. *M. f. suppositorium*).

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* Hardy and Hebra have employed india-rubber cloth dressing in eczema with good results; it is used in the form of gloves, garments, or bandages, according to the requirements of the case. The smooth side of the cloth is applied to the skin; by this means the secretions (sweat and sebum) are retained, and (favoured by the high temperature) macerate the epidermis thus covered; as sulphur is an ingredient of the cloth, this also exercises a favourable action upon the eczema. Hebra recommends this dressing especially in eczema of the fingers, joints, and scrotum: he has also found it useful in pityriasis, xerosis, psoriasis palmaris, tyloma, and variola.

Devergie recommends the starch bandage in eczema varicosum.

In eczema impetiginosum affecting a child's face, we cover the parts completely with a mask (the inner surface of which has been smeared with oil or unguent), which is kept on until the crusts are removed and new cuticle formed. When eczema arises from the contact and friction of two opposed surfaces, we separate the parts by charpie, or dusting with powder. In *eczema caloricum universale* the cure may be effected by regulating the temperature and dusting the entire surface with starch, the employment of ointments or tar being superfluous. Caustic remedies are only applied in the case of circumscribed eczema with considerable infiltration. Diachylon ointment may be safely employed even by the inexperienced practitioner, as this remedy (unlike some others we have mentioned) is useful in all forms of eczema.

Bullous Inflammatory Affections.

PEMPHIGUS (*Blasenausschlag, Pompholix*).

The disease known as pemphigus is characterised by the formation of bullæ, arising from effusion under the epidermis, of a clear yellowish, or slightly turbid and puriform fluid; these blebs (varying in size between that of a millet seed and that of an apple) occur at different parts of the surface of the skin and mucous membrane; the surrounding skin either retains its normal aspect or appears reddened, the periphery of the bulla frequently presenting radial streaks of redness (lymphatic or blood-vessels). If the epidermis forming the roof of a bulla be removed at an early period the corium will be exposed, but in a bulla of longer duration we observe that a new cuticle has been formed, so that the fluid of the bulla is contained between two layers of epidermis. When the bleb is healed it leaves a dark stain, and rarely a cicatrix. We distinguish *acute* and *chronic* pemphigus. The *acute* form of the disease frequently occurs in children and rarely in adults; it runs its course in from three to six weeks with or without febrile disturbance, and usually in successive outbreaks. The eruption of blebs is sometimes preceded by erythematous redness; in exceptional cases the contents of the blebs are sero-hæmorrhagic. In most cases the disease runs a favorable course as desiccation of the blebs takes place, and the excoriations heal without leaving cicatrices; the only cases in which we may expect a fatal termination are those in which an extensive bullous eruption occurs in cachetic and ill-nourished children. From the observations of *Wichman*, *Rayer*, *Gilibert*, *Bærensprung*, *Thomas*, *Steffen*, *Mosler*, *Köbner*, *Steiner*, and others, the occurrence of acute pemphigus can scarcely be regarded as doubtful, although this is denied by *Willan*, *Bateman*, and *Hebra*; this disease, which has been seen frequently in children, has, however, rarely been observed in adults. The *chronic* form of pemphigus is characterised by successive eruptions of bullæ, during a protracted period, which produce a lowering effect on the system, terminating in fatal exhaustion. The phenomena of chronic pemphigus in some cases differ from those which we have described. The subjective symptoms, if present at all, consist in a burning and itching sensation.

Pemphigus foliaceus. This is an eruption of small bullæ with flaccid capsules and milky or yellowish contents, which dry up into crusts; or the blebs burst at an early period, leaving torn shreds of the epidermic capsules at the excoriated parts. On removing the crusts (if any exist) the subjacent cutis is seen to be excoriated, and the under-surface of the crusts presents numerous irregular plugs of sebum, which occupied the excretory ducts of the follicles; normal epidermis is never formed under the crusts.

The division of the disease into the following varieties is not to the purpose:—

1. *Pemphigus benignus* occur chiefly in children, lasting six or eight weeks; recurrence does not take place.

2. *Pemphigus malignus* or *cachecticus*, in which, after the bursting of the blebs excoriations are left, which become covered with croupous exudation; this affection terminates fatally.

3. *Pemphigus gangrenosus.* Under this term Stockes describes a disease which occurs during the first three years of life in the children of the poor living in damp localities. Within two or three days blebs appear which contain a limpid, whitish, or yellowish fluid; these become confluent, and burst, discharging an offensive fluid; the edges are undermined, and the base of the bulla presents a gangrenous aspect. The disease is chiefly located behind the ears, and sometimes occurs also on the hands and feet, rarely in the arm-pit, on the breast, abdomen, and on the inner surface of the auricle, in the mouth, and on the lips. The disease destroys the auricle, extending even to the external auditory canal, and sometimes also attacks the eye, producing blindness. The fatal result usually takes place in ten or twelve days, with symptoms of complete prostration.

Amongst a large number of children suffering from pemphigus, we observed only one similar case, but we do not feel justified in describing this as pemphigus, for it occurred in a child who had become quite hydræmic from tussis convulsiva and profuse diarrhœa, and in whom hæmorrhages in the kidney occurred simultaneously with those in the skin; the eruption appeared within a short time on the face, hands and feet, in the confluent form, and on the trunk in the form of isolated flaccid blebs (of the size of a pea) with dark red contents. We believe this disease to be more accurately described as *Purpura scorbutica.*

The formation of blebs or bullæ also occurs on the mucous membrane of the mouth and pharynx (*Rollett*); the epithelial capsule soon bursts, leaving an excoriated surface.

Etiology. The causes of this disease are still obscure. From statistical data, it would appear that one in seven hundred infants suffer from pemphigus. According to Steiner (Arch. f. Dermat. u. Syphil., 1869) the affection is most frequent during the first month of life, and less so between the sixth and eighteenth; its occurrence is not influenced by sex, constitution, climate, season, or diet, or by the suppression of the urinary secretion, arthritis,* or syphilis.

Anatomy. On microscopic examination, the contents of bullæ are found to consist of serum, in a later stage with admixture of pus, and sometimes also of blood; the chemical reaction is at first neutral, and later slightly alkaline. Primarily the cells of the rete Malpighii are elongated, so that the bulla exhibits a loculose structure (this is not so marked as in burns, where the cells form complete septa); at a later stage the entire cavity of the bulla is occupied only by fluid.

The chemical analyses of the contents of the bullæ, or of the urine, have not hitherto afforded sufficient data for any conclusions as to the nature of pemphigus; this applies also to pathological anatomy, as only in one case amyloid degeneration of the liver and spleen was observed.†

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* Malmsten found uric acid crystals in the bullæ.

Bamberger (Würzb. med. Zeitschr., 1860) from an examination of the bullæ, as also of the urine, in cases of pemphigus, found that the excretion of urine is considerably less than in the normal condition; the urine, however, is relatively richer in urea, uric acid, chlorides, and earthy phosphates, but deficient in phosphoric and sulphuric acids; the most striking characteristic being the presence of ammonia; it does not contain albumen or sugar. The contents of bullæ showed pus, a few blood corpuscles, epidermal cells, shreds of fibrous tissue, as well as leucin and tyrosin; ammonia was detected, but not urea. The blood showed a decrease of its solid constituents, especially of albumen. Bamberger believes that the ammonia primarily exists in the blood, passing thence into the bullous contents, (see Arndt, Jahrb., 1860).

† Dr. Hertz (Greifswalde, med. Beitr.) describes a case of chronic pemphigus in a girl (æt. 21), the disease having existed from infancy. The post-mortem examination showed—the body small and anæmic, the general surface of the skin of a pale tint; on the trunk, as well as on the upper and lower extremities (with the exception of the palms of the hands and soles of the feet) numerous irregular dark pigmented patches (from ½ to 1″ in diam.) covered on many parts with crusts: the inguinal, axillary and mesenteric glands swollen, spleen flaccid, its parenchyma being greyish-red and soft, the trabecular tissue largely

Diagnosis. In general the diagnosis of pemphigus is not difficult if we take into account the characteristics of the bullæ. The diagnosis between this affection and Herpes Iris, however, is somewhat obscure, on account of the similarity of the bullæ, and we admit that the distinction between a fully developed herpes and pemphigus can only be arrived at by observing the course of the disease. Herpes runs its course rapidly without recurrence, whilst in pemphigus fresh outbreaks of bullæ occur, even in the acute form of this affection.

Prognosis. The recurrence of scattered bullæ after long intervals is never dangerous; if, however, the bullæ become very numerous, and their contents rapidly undergo degeneration, lymphangiotis occurs in the surrounding parts, the strength of the patient is impaired,—pyæmia, pneumonia, nephritis, or pyelitis sets in, and the prognosis is highly unfavourable. When pemphigus occurs in children it may take an unfavorable course, if complicated with bronchial or intestinal catarrh, or with diseases of the kidney, as hæmaturia (*Steiner*). In chronic pemphigus of adults, and in pemphigus foliaceus the prognosis is always unfavorable.

Treatment. Of internal remedies only quinine is worthy of notice, this remedy acting as a prophylactic in cases in which the eruption of bullæ is preceded by febrile symptoms; and it may also

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developed; the enlarged Malpighian vesicles presented the appearance of numerous semi-transparent, sago-corn-like structures; the liver was enlarged, its acinous structure scarcely perceptible (the yellowish-grey peripheral, only at parts distinguishable from the central greyish-brown portions of the lobules; the cortical substance of the kidney was somewhat contracted, and of a dirty-yellowish colour.

On microscopic examination of the liver its peculiar cells were scarcely distinguishable, only transparent and lustrous clumps of irregular form and variable size being seen, besides abundant free fat granules and a small number of the degenerated liver cells (with nuclei and fatty contents); on the addition of iodine and sulphuric acid the well-known reaction was observed. Amyloid degeneration of the spleen also existed, but not of the kidneys or intestinal mucous membrane. On removing the epidermis from a macerated portion of the skin, microscopic examination showed the pigmentation of the dark patches to depend not on diffused, but rather small punctated pigmentary deposits. On examining microscopically a vertical section of the papillary portion of the corium, longitudinal dark streaks (consisting of brownish, granular pigment) were observed running parallel to the long axis of the papillæ in close relation to the distended vessels. The papillæ, otherwise, as regards their size and structure, appeared normal,—neither in the stroma nor vessels was the reaction with iodine and sulphuric acid produced. The rete Malpighii showed no abnormal pigmentation.

tend to retard the eruption. Other remedies, as iron, iodide of potassium, carbolic acid, or mineral water (Karlsbad) are of little value. The local treatment consists in baths, douches, and "wet sheet packing," as also in the application of tar; inunction with various ointments, especially Unguent Diachyli, or in powdering with starch, or semina lycopdii.

Pustular Inflammatory Affections.

1. ACNE. (*Finnen*).

Acne appears in the form of papules, nodules, or pustules, varying in size from hemp seeds to beans, and arises from inflammation of the sebaceous and hair follicles. In cases in which the inflammatory process extends deeply, involving the entire thickness of the cutis, the vicinity of the pustule becomes more or less diffusely infiltrated. We distinguish *Acne dissiminata, Acne rosacea,* and *Acne mentagra* (*Sycosis*).

Acne disseminata appears as:

a. *Acne vulgaris,* chiefly located on the face, chest, and back, usually along with seborrhœa and comedones,—presenting the following varieties:—*Acne punctata* when the red papule surrounds a comedone; *Acne pustulosa* when pus is present; *Acne hordeolaris* when the pustule is elongated; *Acne indurata* when the infiltration extends deeply into the skin.

b. *Acne frontalis* (*Acne varioliformis*) occurs chiefly on the scalp and forehead, in the form of papules or pustules (as large as hemp seeds), which become dried up in disc-like crusts, leaving cicatrices; this affection appears chiefly in conjunction with, or as the sequel of eczema.

c. *Acne cachecticorum* occurs in ill-nourished or cachectic persons, in the form of papules of coppery or bluish-red tint, or as pustules with sero-purulent contents,—located on the chest, abdomen, inguinal region, back and breech—sometimes associated with *Lichen scrophulosorum.*

d. *Acne artificialis,* produced by the action of tar (*tar acne*). The action on the skin, of different medicinal agents, produces morbid changes, which vary according to the susceptibility of the individual, and the duration of the irritant; these changes are either transitory redness, swelling, and inflammation, or superficial abrasions. Of such agents, tar is especially important, and the phenomena produced by its action may be divided into those caused by the local application of fluid tar, and those arising from the action of an atmosphere impregnated with the vapours of tar. The changes due to the direct application of fluid tar are *general* or *local.* In some cases the general symptoms are absent, or appear only when extensive parts of the skin have been treated with tar; they consist in oppression of the head, gastric pain, vomiting of dark coloured fluid, and black fœcal evacuations; besides, in all cases, when tar has been rubbed into the skin, of at least the third part of the body, dark-coloured urine is soon excreted, which gradually becomes lighter in tint; on the addition of sulphuric acid the odour of tar is readily perceived, and on adding chloride of iron, a beautiful blue colour is developed. It is unimportant which of the preparations of tar (*Ol. fagi, rusci,* or *cadini*) are employed in order to produce this phenomenon. The changes in the urine are especially marked within the first few days after the application of tar, whilst after repeated use of this agent the changes of colour are scarcely perceptible. The further absorption would appear to be diminished by the gradual occlusion of the excretory ducts of the follicles by the tar. The coloration of the urine is not observed in the case of patients after the use of the continuous bath for several days, although the entire cutaneous surface had previously been treated with tar.

The local effects of tar may be *acute,* consisting in swelling, redness, and inflammation, or in the development of acute eczema, which extends even beyond the parts to which the tar has been applied; in such cases we must desist from the further employment of this remedy. Although we are unable to predict the beneficial or injurious effects, the value of this remedial agent in skin diseases is so great, that the occurrence of these forms of dermatitis does not contra-indicate its use. As the result of long continued inunction of tar, quite other changes take place, thus every dermatologist knows that suppuration frequently takes place beneath the coating of tar, although the disease under treatment is in process of cure; the pellicle of tar, previously closely adherent to the skin, is thus raised. On painting a portion of the healthy skin with tar, we observe after the first eight days, that the apertures of the excretory ducts of the follicles are indicated by black points, resembling comedones; a few days later these points become surrounded by pale-red rings, which, enlarging, gradually form papules—varying in size from that of a pin's head to that of a pea—(Acne nodules), which lastly suppurate (Acne pustules). The action of an atmosphere impregnated with the vapours of tar produces similar results; in such cases eruptions appear on the entire cutaneous surface, especially on the face, which presents numerous comedones, as well as acne nodules and pustules; the ocular conjunctiva is injected, and sometimes displays vesicles; the chest and back are frequently unaffected, whilst the lower extremities are covered with comedones or acne nodules and pustules, which latter sometimes attain the size of hazelnuts. As these effects are similar to those produced by fluid tar, it is evident that the vapour is also the cause of acne. Amongst the work people employed in a factory, where tar, instead of grease had been used for lubricating the wheels, I observed an eruption similar to that caused by tar, and after its use was discontinued, no cases of this kind occurred. In tar manufactories, acne is of very frequent occurrence. That the eruption is not produced by the inhalation of tar, is proved by the fact that the parts of the body covered by clothes, as the chest and back, (which are otherwise the favorite seat of acne disseminata) remain free of the efflorescence, whilst the face and extremities are attacked.

The form of acne caused by the internal use of *iodine* belongs to the same category. According to Voisin (Wiener med. Wochenschrift, 1869), *bromide of potassium* also produces several varieties of acne.

In children, acne is never observed; the affection very rarely appears before puberty; it occurs in both sexes, even in old age, and occurs in all climates. In regard to the causes of acne, little is known; that persons of abstinent habits are especially liable to this affection is not true, as it is met with in those addicted to excessive venery as well as in those who are chaste; nor can we believe that acne may be produced by particular kinds of food, as those containing much salt, pepper, etc. The affection is especially frequent in those who are the subjects of dyscrasic diseases, as tuberculosis and scrophulosis, in whom, as is well-known, the sebaceous secretion is frequently abnormal.*

Course. As before mentioned, acne consists in an inflammation of the hair-follicles and sebaceous glands, arising from the accumulation of a plug of sebum which hinders excretion from the glands, and thus, by mechanical irritation, leads to inflammation of the follicle. The course of the morbid process can readily be observed; thus, on a part which is the seat of a dry comedo-plug, slight inflammatory redness is usually produced by rubbing or attempting to squeeze out the comedo with the fingers; the comedo becomes saturated with serum, and in this semi-fluid condition is most easily squeezed out; if it is not removed, however, a dense and painful inflammatory infiltration results, and the contents of the sebaceous gland being mingled with pus and constantly augmented by fresh exudation, thus form a pustule, which either bursts, or dries up into a yellowish brown crust, which is spontaneously thrown off, leaving a shallow cicatrix. If the inflammatory process be more severe, extremely dense, furuncular-like infiltrations (varying in size from that of a pea to that of a hazel-nut) extend deeply into the tissue of the cutis; these only gradually undergo suppuration. In these cases the inflammatory process would appear to involve, at one time, large groups of the sebaceous glands. In acne cachecticorum, the progress of the inflammatory process is extremely slow; the large pustules become dried up into crusts, on the shedding of which, more or less pigmented and shallow cicatrices are left.

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* Chausit describes *acne atrophica* as a peculiar change in the sebaceous glands, which is shown by increased secretion, leading to the formation of brownish, hard, and closely adherent crusts—under which the skin appears reddened and lustrous; the glands gradually undergo atrophy, a deep-seated, white cicatrix being left. The favorite seat of the disease is the face; it lasts from three to six years; the cause is obscure. This description seems to apply better to Lupus erythematodes.

Prognosis. In some of the acute varieties of acne, disappearance takes place spontaneously; but acne disseminata on the face, chest, and back, is an extremely obstinate skin affection, and from its frequently renewed outbreaks, requires months and even years of treatment. The form of acne due to tar is cured, of course, by the removal of the cause; and in acne cacheticorum, the most important indication is the treatment of the constitutional complaint.

Treatment. Omitting the long list of internal remedies, which have for the most part proved useless, I pass at once to the local treatment of acne. As comedones appear simultaneously with acne, they must be treated according to the method we have already described (see page 60). The most important part of the treatment consists in scarifying the pustules of acne, and applying *spiritus saponatus alkalinus*, glycerine soap, or alkaline cream; these agents are to be well rubbed into the skin by means of rough flannel. It is advisable to omit these applications every fourth day, in order to avoid excessive irritation of the skin. We may also use sulphur, pumice-stone, and iodide of sulphur soap (which are to be rubbed in along with ordinary soap, and left on the skin for some hours), or the following preparation:—*Lac. sulphur,* *Glycerini, Potass carbon., Alcohol a.a. part aeq.* (*Zeissl*). This sulphur paste is to be applied to the affected part at night, and washed off next morning with almond lotion. The use of douche and vapour baths will also be of service. In some cases of acne indurata, in which the skin is usually much infiltrated, I do not adopt scarifications, but apply mercurial plaster during the night; this usually leads to the disappearance of the infiltration: we may scarify only when the pus is superficially accumulated. In acne affecting the chest and back, the *solutio Vlemingkx* may be rubbed in and left on the skin several hours. Cupping (also dry cupping) is of service in acne of the chest and back. Iodized sulphur (4 iodine to 1 sulphur) and corrosive sublimate have also proved useful. Kummersfeld's lotion (consisting of sulphur, gum, camphor, lime, and rose water), alcohol, ether, and "Princessen lotion" (*Aq. frag.* ℥vi., *Pulv. Alum. plum.* ʒj.) may be mentioned, as also *furfur amygdal., tinct. benzoat,* and *borax.*

2. ACNE ROSACEA (*Kupferrose*).

This affection occurs on the face, the parts chiefly attacked being the nose, cheeks, and forehead, as also on the neck in the form of a diffused redness, or in isolated nodules, pustules, and macules. It is a chronic inflammation of the skin, causing permanent stasis in the blood vessels, to which the redness is due; the existing blood vessels are distended, or new vascular growth takes place in connection with the efflorescence of acne. When the disease has lasted a long time, large excrescences are formed, arising from cell-infiltration and hyperplasia of the connective tissue of the skin. In the most severe degrees of this affection there are formed lobular and reddened protuberances (rhinophyma) of the size of a man's fist, containing numerous comedones, which are either pedunculated or seated on a broad base. In the first degree of acne, rosacea, it is usually accompanied by seborrhœa of the nose, so that the parts appear shiny and reddened, and cold to the touch. In the second degree, on portions of the skin, reddened from the distended and newly formed vessels, the nodules of acne arise, which vary in size from a pin's head to a hazel-nut. In the third degree, isolated portions of the nose appear normal, whilst the intervening portions present acne nodules and excrescences. The most frequent cause of acne rosacea in men is excessive indulgence in alcoholic drinks, but all the conditions which induce seborrhœa of the nose (as, for instance, disorders of the generative system in women), also favor the occurrence of the disease.

Diagnosis. The phenomena somewhat resemble those of *frost-bite;* the nose suffers in this way from cold, however, only in anæmic subjects, especially chlorotic girls, and never in healthy people,—the affected part presenting an uniform bluish-red colour, the surface being more shiny and the swelling more considerable than in acne rosacea. 2. Acne may be confounded with *lupus erythematodes,* which in a similar way attacks the face; in lupus, however, there occur scales or crusts, which are closely adherent to the apertures of the sebaceous follicles; whilst in acne, nodules and pustules are present, but rarely scales. In lupus there is a loss of substance; in acne this is not observed. The most important distinction, however, is, that in acne, pustules frequently appear, whilst these never exist in lupus. 3. It is scarcely possible to mistake acne for *lupus vulgaris* or *tubercular syphilis* if we attend to the characteristics of the disease.

Prognosis. Although the morbid changes in the skin are readily curable by the measures about to be described, the great difficulty of the treatment consists in preventing recurrent attacks, as the disease chiefly appears in sterile women, who suffer from organic disorders of the generative system, and also in habitual drunkards, with whom it is rarely possible to enforce abstinence from spirituous liquors. The prognosis is most favorable in those cases in which the disease results from seborrhœa in ill-nourished subjects.

Treatment. The remedial measures indicated under acne disseminata, are also serviceable in this affection, the only difference being the treatment of special phenomena; thus, for instance, the dilated vessels must be laid open, and the parts touched with nitrate of silver, excrescences are to be removed, and the acne pustules scarified. In these cases also, I have successfully employed the *Emplastrum mercuriale,* and also an ointment consisting of:—*Liquor ferri sesquichlor* (ʒj.), *Ung. simplex* (℥j.). In many cases also a concentrated solution of corrosive sublimate (gr. v., ad. ℥j. aq. dist.) is used with advantage, especially when there is considerable pigmentation of the skin arising from acne; the same remedy in the form of a lotion is also of use:—

℞. Hydrarg. sublim. corros. gr. j.
Tinct. benzoat ʒij.
Aq. rosar. ℥vi.
S. Lact. arsen. (*Purden*)

3. SYCOSIS (*Acne mentagra, Bartfinne*).

This affection is characterized by the formation of papules, tubercles, and especially of pustules and infiltrations on the hairy parts of the face; it may occur also on other hairy parts of the body. There first appear tubercles (of the size of a millet seed, a pea, or even larger), developing into pustules, which dry up into circumscribed or (if confluent) large irregular crusts. These pustules are each traversed by a hair, the root of which on being pulled out appears swollen, bent, and saturated with purulent matter. The surrounding skin, especially in acute cases, is considerably swollen and œdematous, and frequently moist, as in eczema; there are also flat, circumscribed pustules not projecting above the surface of the skin, which are penetrated by hairs. At a later stage abscesses are formed, so that the entire area of the beard becomes covered with numerous circumscribed purulent accumulations, of the size of a hazel-nut or larger. In other cases, broad condyloma-like elevations are formed; the thickness of the crusts depends upon the luxuriance of the beard. The eruption sometimes disappears spontaneously, leaving superficial cicatrices on the part. When the disease is of long duration the submaxillary glands also become swollen.

The parts attacked by sycosis are:—the hairy portions of the face and neck, and of the nasal mucous membrane, (vibrissæ), eye-lids, eye-brows, and in rare cases also, the temporal regions of the hairy scalp (especially after attacks of eczema). The inflammatory process in sycosis never extends beyond the parts thickly covered with hair. On the pubic and axillary regions, in both sexes, phenomena similar to those of sycosis of the face occur.*

Diagnosis. Sycosis may be confounded with *eczema* or *syphilis*, but errors can be avoided by attention to the fact that sycosis only occurs on the hairy parts of the face in men; further, by the absence of itching, and oozing from the surface, which are so characteristic of eczema. When the skin is covered with crusts, however, the phenomena are alike in both affections, and we have only one diagnostic character, viz. :—that eczema extends to the parts unprovided with hairs, whilst sycosis remains limited to the hairy parts. Sycosis is distinguished from syphilis by the fact that in the latter, on removal of the crusts, ulcers are apparent, whilst in the former there is either superficial, or no loss of substance.

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* As we have mentioned in the introduction, sycosis is one of those affections known in ancient times, (*Aetius, Paulus Aeginata, Celsus*) which was especially described by *Plinius.* We learn from the description given by the latter author that the disease occurred not only on the face, but also on the neck, chest, and extremities, in people of the higher ranks of life.

Alibert was the first who included sycosis under acne.

Prognosis. Sycosis is curable, although recurrent attacks are frequent enough during the treatment, the disease finally yields to the measures about to be mentioned.

Etiology. Sycosis consists in inflammation and consecutive suppuration of the hair follicles, the causes of which have not hitherto been ascertained. The disease probably originates at the base of the hair follicle, where the prolongation exists, containing the minute young hair, which in its growth penetrates the mother follicle before the old hair has been expelled. In exceptional cases, therefore, both the old hair and the new one may remain within the follicle, and in this way cause inflammation of that structure *(Hebra)*. According to another view *(Wertheim)*, the origin of sycosis is explained by the hypothesis that the thickness of the hair relatively exceeds the diameter of the follicle. *Cazenave* attributes the disease to the use of blunt razors. *Rayer*, *Devergie*, and *Gilbert* regard sycosis as a mechanical inflammation; others believe that it arises from the long continued operation of heat, or from uncleanly habits. We have, however, repeatedly observed sycosis in persons of very cleanly habits, without being able to ascertain the true cause of the disease. According to the experience of Hebra, sycosis is more frequent in people who allow the beard to grow. *Grubi*, *Bazin*, *Köbner*, *Anderson*, and *Hardy* have described a new species—*Sycosis parasitaria*; in Germany this variety is extremely rare; although we have examined the hairs microscopically in nearly every case of sycosis, and our researches were conducted in the Hôpital St. Louis, and other hospitals, we only succeeded twice in finding the fungus of Herpes tonsurans in the hairs which had been extracted from the tubercles. The parts surrounding these tubercles displayed distinct rings of vesicles like those of herpes tonsurans, whilst the ring-like form of that disease was visible on the non-hairy parts of the face. This form of the disease may be looked for in grooms and people frequenting stables and other damp places.

Treatment. It is evident from the foregoing that the treatment of sycosis is exclusively local. The crusts are to be removed by oily applications, and if the subjacent skin be inflamed and the suppurating follicle opened, the hairs are easily extracted by means of the forceps (the method of epilation),* and the *Unguent diachyli albi* is then applied to the skin (spread on a piece of linen to the thickness of the back of a knife, and changed night and morning), or the *Unguent zinci benzoat* may be used. When the tubercles are very numerous, the application of warm poultices tends to soften them. If the parts around the follicle are much thickened, a combination of *Unguent diachyli* and *Emplast. mercuriale* may be used with advantage. We also employ inunction with potash soap or *Spiritus sapon. alkal.*, sulphur paste, iodide of sulphur soap, sulphur, lime and red precipitate, and also douche and vapour baths; shaving the parts daily is an important part of the treatment; in certain cases, however, this may be omitted. In sycosis of the nostrils and eye-lashes epilation is necessary, followed by the use of red precipitate ointment (gr. j. ad. ʒj.); on these parts the cartilage is usually thickened. Escharotics—as concentrated acetic, chromic, and nitric acids, are only employed in the most obstinate cases; incisions are required only when the pus is deeply seated in the tubercles.

4. IMPETIGO (*Pustelflechte, Ecthyma, Eiterblasen*).

As already stated, we describe as *pustular* those forms of efflorescence in which the epidermis is elevated by purulent matter (see page 33).

As pustules are various in their size, the terms *achor, pustula phlyzacica,* and *pustula psydracica* were employed by the older authors to distinguish the varieties; we indicate these differences by comparing them to pins' heads, millet seeds, peas, etc. The designation *impetigo* (*psydracion*) is given to pustules of the size of a millet-seed, or larger, with sinuous edges, and contents which dry up into crusts ; the term *ecthyma (phlyzacion)* denotes larger pustules (of the size of a sixpence, or so) with crescentic periphery and purulent contents, mixed with blood, which dry up into dark-brown crusts.

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* Stroganov instituted a series of experiments in animals in order to ascertain the time required for, and anatomical changes concerned in the regeneration of the hairs after epilation. The hairs on the back of a dog were carefully extracted with forceps, and after the lapse of different periods, varying from one to sixty-six days from the operation, the part was cut out, and (after being hardened) examined with the microscope. This investigation showed that all the hairs had not been artificially extracted, but that the majority had broken at the upper part of the hair-follicle, rarely at the bulb, and still more rarely under this so as to separate the hair completely from the papilla. When the bulb is pulled out, young pigmented cells form on the surface of the papilla in from three to five days after the operation; these cells gradually extend along the hair-follicle, which finally becomes completely occupied by them, as was distinctly observed by Stroganov, after three or five weeks. These cells long remain irregularly placed, and the hair is only formed from them very slowly; even on the sixty-sixth day after the operation, he could not observe an arrangement of these cells resembling that of a hair. But when the hair is broken above the bulb, the new hair is usually formed rapidly,—the higher it is broken the greater is the rapidity of the growth. (Centralblatt für med. Wissenschaften No. 33, 1869).

In their origin pustules are idiopathic or symptomatic, resulting from the inflammatory process, which arises traumatically, or from the chemical action of various irritants, as mesereon and croton oil, or from the influence of heat (which first produces sudamina, and later, blebs and pustules), or from other injurious agencies, acting upon the skin ; thus, impetigo is seen in adults as the result of pediculi vestimentorum, scabies, and the inunction of irritants ; further, this affection occurs in persons who have lived long in damp localities, also in cases in which the legs are varicose from too much walking. As a symptomatic affection, pustules occur in erysipelas and variola, and also as the result of metastasis. In old people impetigo frequently occurs independently of any of the enumerated agencies.*

Diagnosis. Impetigo and ecthyma are readily distinguished from similar eruptions by their localisation chiefly on the legs. Nevertheless, errors of diagnosis may arise, especially with *rupia syphilitica,* and the following points of distinction are therefore to be noticed. In rupia syphilitica the crusts are thick and mostly acuminated, the several layers being super-imposed in the form of a pyramid, whilst in impetigo the crusts are thin, soft, and easily separable from the subjacent parts ; on removing the crusts of rupia a loss of substance is observed, *i.e.*, an ulcer with steep edges and granular base; under the crusts of impetigo, however, there is either a layer of young epidermic, or only an excoriation of the cutis.

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* According to C. Heitzmann (Comp. d. chir. Pathol. und Therapie, 1869) scratching is to be regarded as the chief cause of isolated ecthyma pustules. This observer experimented on his own limbs, and found that these pustules were produced by scratching an excoriated part. When the patient continues to walk much, the parts show little tendency to heal (as the ulcerative process rather increases), resembling the morbid conditions known as varicose ulcers. Heitzmann believes these itch-pustules to be the most frequent cause of ulcers on the legs, and experience tends to confirm this observation, as these conditions often arise in cases in which the cutaneous veins are not varicose.

Tilbury Fox (Journ. of Cutan. Medic. and Diseases of the Skin, October, 1869) describes a *contagious* form of impetigo ; Anderson confirms this observation. The affection appears to be very common in England. Although we have observed several members of a family simultaneously attacked by impetigo, we are not therefore justified in concluding that the affection is contagious. It seems much more likely that similar injurious agencies acting upon the various individuals have given rise to similar phenomena.

Treatment. The chief indication is the removal of the causes to which these morbid processes are due; for removing the crusts we employ oily substances, baths, warm or cold fomentations, or if necessary, the various ointments, as *Unguent diachyli*, *Empl. de Meliloto*, and *Empl. fuscum*.

Squamous Inflammatory Affections.

1. PSORIASIS *(Lepra Willani, Schuppenflechte).*

The disease known as psoriasis is characterised by the formation of more or less thickly aggregated layers of shining pearly scales, seated on a reddened base, from which they are easily separated by scratching with the nail; on removal of the scales a pale surface is at first exposed, which later appears reddened, and finally bleeds. The scaly masses vary according to the duration of the disease, being most abundant at the commencement of the attack, and gradually diminishing in the later stages, during which also the corium shows less tendency to bleed. Further, the scales diminish as the nutrition of the skin becomes impaired, in consequence of general nutritive disturbance, or as the sequel of febrile affections.

In regard to the form of the efflorescence, we observe at first punctiform heaps of epidermis *(psoriasis punctata)* which gradually enlarge, assuming the appearance of drops of mortar *(psoriasis guttata)*; at a later stage, these patches become discoid *(psoriasis nummularis)*. When the patches heal in the centre, whilst enlarging in the periphery, *psoriasis orbicularis* is produced. If two or more ring-like patches of psoriasis come into contact the point of coalescence disappears, and from the peripheral extension of the efflorescence variously curved lines are formed, which present the characters of psoriasis *(psoriasis gyrata)*. If the disease invades large tracts of the skin, the above described forms disappear, and the entire surface is covered with scales seated on an infiltrated base (*psoriasis diffusa, agria, inveterata*). *

The parts on which psoriasis at first appears are, almost exclusively the extensor surfaces of the elbow and knee joints, on which the affection may exist for years without attracting the attention of the patient, until other portions of the cutaneous surface are invaded. The trunk, as well as the face and scalp are also frequently attacked; the scalp, however, only when the disease has previously affected other parts. On the palm of the hand, we have hitherto seen only one case of genuine (non-syphilitic) psoriasis, whilst the remainder of the cutaneous surface was entirely free; when we saw the same case two years later, the extensor surfaces of the elbow joints were also involved. Some authors distinguish psoriasis of the *nails;* without concomitant affection of other parts, the nails become yellow, thick, dry, brittle, and easily separable; we are, however, scarcely justified in terming this psoriasis.

In psoriasis of the face the scaly masses and infiltration of the skin are usually less considerable than on other parts.

Psoriasis, in most cases, is attended with itching only when it first appears, and when fresh patches are breaking out; even then it is much less severe than in eczema, prurigo or scabies. When the eruption is fully developed, there is either no itching, or it is very slight. The further symptoms are dependent upon the duration, seat, and extent of the morbid process; the more protracted it becomes the deeper is the infiltration, and the more the elasticity of the skin is diminished, causing rents and fissures—chiefly on the flexor surfaces of the extremities —the palm of the hand and sole of the foot being sometimes so deeply fissured as to give rise to the most acute pain on movement.

Diagnosis. Although, in the majority of cases, this account of the characters of psoriasis is sufficient for the diagnosis, we may notice the diseases with which it may occasionally be confounded: these are—*Psoriasis syphilitica, Lichen exudativus ruber, Eczema squamosum, Seborrhœa, Favus, Lupus exfoliativus, Lupus erythematodes, Herpes tonsurans squamosus.*

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* Anderson describes another variety (*psoriasis rupioides*) in which the accumulation of epidermis takes place in concentric rings, which are super-imposed in the form of a cone (like the limpet), and from their resemblance to rupia, Anderson derives the term "rupioides."

The points of distinction between *Psoriasis vulgaris* and *P. syphilitica* are the following:—in the *first*, there are large scaly masses of a lustrous, pearly appearance (from the presence of air between the epidermic lamellæ) loosely attached to the substratum, on the removal of which a bleeding surface is exposed; in the *second*, the scaly masses are minute, of a dirty-whitish colour, closely adherent, and, on removal, showing a pale red infiltration: in the latter case, the scales originate merely in an exfoliation of the superficial layers of a syphilitic infiltration.

Psoriasis—Lichen ruber. In psoriasis the papules vary in size from that of a pin's head to that of a sixpence, or even larger, whilst in lichen they scarcely attain that of a pin's head or millet seed; in the former the scaly masses are large, in the latter minute. In psoriasis the papules are never collected into groups as is usual in lichen, and in the latter case when a large area is involved, the diagnosis is rendered more difficult by the presence of numerous scales, but on careful examination of the periphery of such a patch, we find fresh papules similar to those first formed, whilst in psoriasis the extension takes place by enlargement of the individual papules.

Psoriasis vulgaris—Eczema squamosum. The scaly masses are usually larger in psoriasis than in eczema; further, on removal of the scales of the former, a bleeding corium is exposed, a pale red surface in the latter, E. squamosum, being the terminal stage of the disease, is preceded by papules, vesicles, and discharge, whilst in psoriasis, masses of epidermic scales constitute the primary eruption. Eczema is usually attended with severe itching; in psoriasis this is either absent or very slight.

Psoriasis vulgaris—Seborrhœa. These affections are liable to be confounded only when located on the hairy scalp in adults, as psoriasis never occurs in infancy, during which period seborrhœa is most frequent. The following points of distinction may be noticed:—Seborrhœa occurs on the scalp, especially the vertex, in the form of confluent crusts, whilst the patches of psoriasis consist of dried epidermic scales which, although thickly accumulated, always exhibit the circular form, the margins of the patches on the forehead and neck presenting a crescentic outline. Further, psoriasis only appears on the hairy scalp subsequently to its occurrence on other parts; as, for instance, the extensor surfaces of the elbow and knee-joints.

Psoriasis—Favus. These are readily distinguished by the presence of *scales* in psoriasis, of *crusts* in favus. In psoriasis the scales consist of epidermic masses intermixed with fatty matter: in favus the crusts are formed by exudation, epidermic scales, and fungi. The hairs in psoriasis although less glistening, remain elastic and firmly attached to the follicle ; in favus they are brittle, easily extracted, and display fungi in their interior ; even when favus at its commencement and termination presents only scales, it is scarcely possible to confound it with psoriasis.

Psoriasis—Lupus exfoliativus. In lupus the scaly masses are not so large, and the disease is more limited than psoriasis; on removing the scales, the surface appears uniformly reddened and infiltrated, whilst in psoriasis a bleeding corium is exposed.

Psoriasis.—Lupus erythematodes. Lupus occurs chiefly on the face, exceptionally on the body and extremities ; the scales (which in some cases are abundant) are closely adherent to the substratum, and on removal display on their under surface plug-shaped masses of sebum, which have been torn out either alone, or with the follicular wall. The scales in psoriasis present a smooth surface and are easily separable.

Psoriasis.—Herpes tonsurans squamosus. In the latter the mass of scales, as well as the infiltration are less extensive than in the former ; on removing the scales, the skin usually appears dry, and microscopic examination shows fungi.

Etiology. The numerous theories hitherto advanced do not throw much light on the origin of this disease; thus Wilson regards it as the expression of a specific poison, which, having once appeared, is transmitted throughout several generations. Contrary to the supposition of its connection with syphilis, we may assert positively that psoriasis mostly occurs in healthy subjects, and that it resists the entire series of anti-syphilitic remedies. Nor can we attribute the disease to climatic or dietetic influences, the abuse of alcoholic drinks, or the occupation of the patient.

Anderson, in particular, states that debility of the system predisposes to the outbreak of this disease, and relates the cases of two nursing women in whom psoriasis always appeared when the patients were suckling male children, whilst there was no trace of the eruption when they were nursing female children. He concludes therefore that the debility induced by suckling the boys was greater than when girls were nursed, the former requiring more nourishment than the latter.

According to our experience, however, psoriasis occurs mostly in strong healthy subjects, and disappears when the nutrition becomes impaired by disease or other causes. The disease is not contagious, but is transmitted from parents to children.

The frequency of psoriasis as compared with other skin affections is variously stated; thus, Hebra found 50 cases of psoriasis in 3000 cases of skin disease; Devergie, 280 in 1800; Wilson, 73 in 1000; Anderson, 282 in 4074. In different countries, therefore, the statistics vary, and by combining them we arrive at an average of 1 in 14 cases. As regards the sex of the patient the statistics also differ; thus, Hebra finds that on an average of every 40 cases of psoriasis, 23 occurred in males and 17 in females; Wilson, in 63 cases, 23 males and 40 females; Anderson, in 196 cases, 97 males and 99 females.

The disease usually occurs about the sixth year of life, and in exceptional cases even earlier.

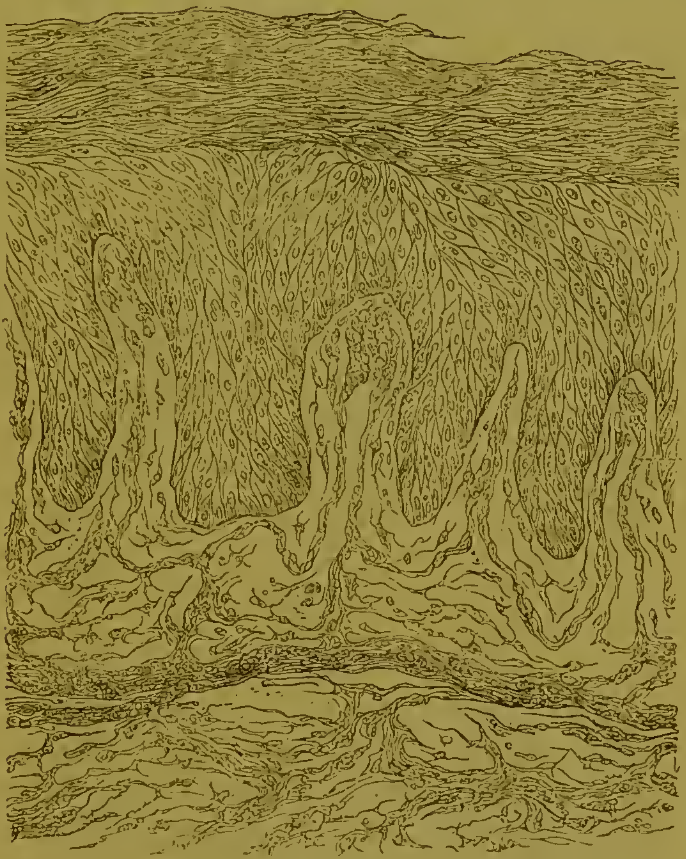
Anatomy. Gustav Simon (Die Hautkrankheiten, page 212) describes the anatomical changes in the skin produced by psoriasis somewhat as follows:—

"The red maculæ which precede the development of the scales, occur probably as the result of a chronic inflammatory process, the swelling being due—if this supposition be correct,—to exudation in the tissue of the skin, the nature of which has not hitherto been investigated. The condition of chronic exudation observed in psoriasis has probably some share in the excessive production of scales, the newly-formed epidermis being continually separated from the corium by the accumulating exudation; beneath the scales that portion of the epidermis which is still perfectly united with the corium (being atrophied) is thinner than in the normal condition."

From this we learn that, although Simon himself did not investigate the anatomical changes in this disease, he was correct in regarding chronic inflammation of the cutaneous tissues as the cause of the profuse formation of epidermis.

Hebra (Path. u. Ther. page 286) gives an elaborate account of the origin, as well as of the various forms, of psoriasis; but in examining the skin of patients affected with this disease, he was unable to discover any post-mortem indications of the anatomical changes, as in the dead body the characteristic appearances are almost entirely obliterated, the red maculæ which form the base of the scaly masses being blanched, and the scales but loosely adherent to the surface; no deviation whatever from the normal state could be detected either with or without the microscope in the papillæ or other dermal structures of the parts which were the seat of psoriasis during life. Hebra was therefore obliged to limit himself to the examination of the morbid products, which consist of piles of epidermic scales, as is sufficiently evident to the naked eye while the patient is alive. Lastly, he believes that the heaps of scales are seated upon an hyperæmic cutis.

Fig. 17.

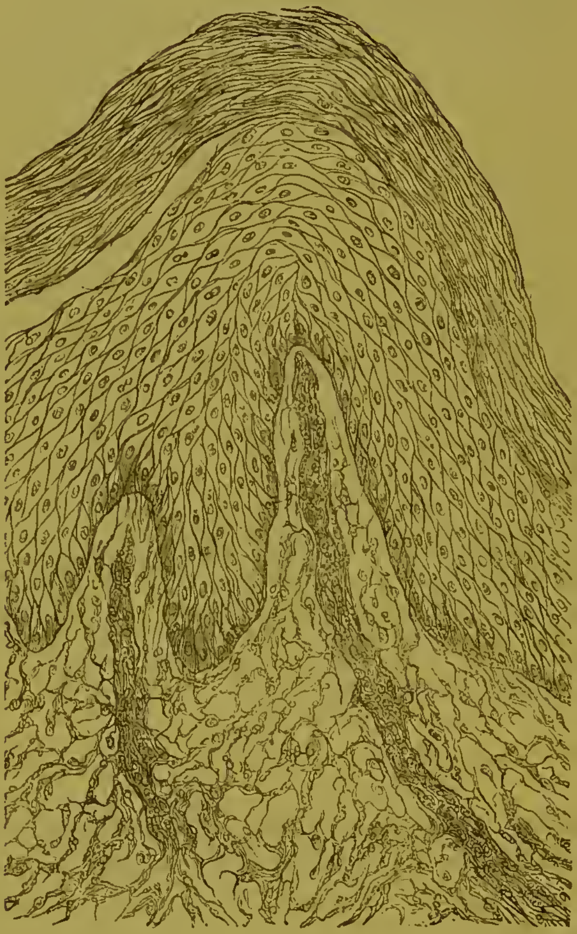


Cell-growth along course of vessels. Transverse arrangement of cells at summits of papillæ.

Wertheim has also investigated the anatomical changes in psoriasis, and has communicated his results to the Imperial Society of Physicians. He excised portions of skin affected with psoriasis, and on microscopical examination found the papillæ enlarged in length and breadth to twelve or fifteen times their normal size; this change was observed in four different cases. Further, the vessels were seen to be distended and tortuous in their course to the summit of the papilla, the stroma of which appeared on vertical and transverse section almost completely filled up by them.

Wertheim has not yet fully confirmed these views by injected preparations of the vessels; he believes, however, that these structures may be regarded as distended vessels from their resemblance to the latter in colour and form. From the enlargement of the papillæ and distension of their vessels, he assumes that the circulation in these structures is impeded, which explains the sharply defined outline of the patches in psoriasis.

Fig. 18.



Epidermis and rete Malpighii largely developed; papillæ enlarged. Cell-growth along vessels and in meshes of corium.

Whilst therefore Simon merely supposed inflammation of the cutis, and Hebra was unable to obtain further results by the microscope, Wertheim always found enlargement of the papillæ, and surmised that the vessels of the latter were distended. These conflicting views induced me to obtain the permission of patients to excise portions of skin affected with psoriasis. Fine sections (from fresh and old patches of psoriasis) treated with acetic acid alone, or with carmine, ammonia, and acetic acid, afforded similar results. I found the epidermic cells and rete Malpighii largely developed; the papillæ, especially those of the older eruption, enlarged. The corium and papillæ are completely occupied by abundant cell-growths, which are chiefly accumulated along the course of the vessels (Fig. 17 and 18) ; there are, however, separate growths which display numerous extensions. This cell-growth is observed chiefly in the superficial layer of the corium and summits of the papillæ where a glomerulus is formed. Whether this growth originates in proliferation of "adventitious elements" or in the migrated white blood-corpuscles, cannot at present be fully established. If we follow one of the larger vessels of the corium and its ramifications in the papillæ, as also its minute off-shoots, (some of which pursue a straight course along the entire structure, others being convoluted at the apices of the papillæ), we observe that the investing cell-growth, which in the earlier course of the vessel was arranged in the long axis of the papilla, assumes at the summit a horizontal or oblique direction (Fig. 17). On transverse section of the papilla, the cell accumulations, which almost completely occupy the stroma, are distinctly seen; the cells form a circle, in the centre of which the vascular canal is observed. From these observations, therefore, we conclude that psoriasis is an affection of the superficial layer of the corium and papillary body, associated with marked cell proliferation, as the result of which the papillæ appear greatly enlarged. This hypertrophy of the papillæ, however, does not constitute the characteristic appearance of psoriasis as it is observed also in other chronic skin affections, as in prurigo and eczema, in which it appears only after long duration of the disease, whilst in psoriasis it is a primary change. The excessive formation of epidermis is therefore only a hyperplasia of the cells of the Malpighian layer, associated with increased desquamation.

Prognosis. As the nature of psoriasis still remains obscure, notwithstanding the researches hitherto instituted, we cannot effect a permanent cure. Nevertheless, all the morbid changes, even in cases in which the entire cutaneous surface is involved, may be successfully treated, and the benefits thus conferred on the patient are considerable: for when the disease is allowed to run its spontaneous course, it frequently lasts months and years, during which time the skin becomes deeply affected, giving rise to severe pain. The period at which relapses occur vary in different individuals; in some cases a few months, or from one to two years, and in others only after an interval of ten years. Psoriasis is rarely fatal, and this only in cases in which the entire cutaneous surface is involved, deep fissures being formed in the skin; and the patient succumbs to the exhaustion thus induced.

Treatment. It would exceed our limits to record the entire series of remedies which have been employed in this disease; we shall therefore enumerate only those which we have found most useful.

1. Internal remedies, as *Aethiops minerale, Graphites, Antimonii Potassio-Tartras, Antimonii pentasulphuretum, Turpethum minerale,* as well as the preparations of mercury and iron employed in other skin diseases, have been used in psoriasis. The *Anthraco-kali* (consisting of a solution of coal in caustic potass) has proved entirely unsuccessful. Cathartic drugs, as the *Hura Brasiliensis,* by producing severe and long-continued purging, impair the general nutrition, and lead to the disappearance of the eruption; the affection, however, always returns when the patient has recovered from their effects. Hence this, like other lowering treatment, as local or general bleeding, is powerless to effect a cure. Equally futile are the internal administration of *Decoct. Zittmanni,* and of preparations of iodine and mercury. The *Hydrokotyle asiatica* (in the form of syrup, pills, and ointment), which we tried repeatedly in Hebra's clinique, is an expensive and quite useless remedy.

Arsenic is justly regarded as a powerful remedy in psoriasis, as it often produces involution of the disease without the assistance of external treatment. It is especially successful in the first stages of psoriasis punctata and guttata, which frequently yield under its administration during four or six weeks. In the severer forms of psoriasis, external treatment must be superadded in order to accelerate the cure. It would appear that the administration of arsenic produces an inflamed condition of the skin affected with psoriasis, thereby diminishing the formation of scales; at the periphery, the efflorescence subsides and finally disappears, leaving patches of pigment. Arsenic does not, however, prevent the recurrence of the disease. The most useful preparations of arsenic are the following:—Fowler's solution (arsenite of potass), Pearson's solution (arseniate of soda), Donovan's solution (iodide of arsenic and arseniuret of mercury), the Asiatic pills (made of arsenic and pepper), and lastly, pills of arsenic and opium.

Fowler's solution (in a drachm and a half of which there is a grain of arsenic). For adults we commence with six drops daily; for a child of six years old, with three drops, either in water or in some infusion, as the *Inf. Melissæ,* or *Chamomillæ.* If it does not disagree with the patient, the dose may be raised by one drop every second day, and in this way gradually increased till it reaches even twenty or thirty drops daily; the dose may then be gradually reduced, and with these precautions, we have nothing to fear even from long-continued use.*

Donovan's solution (prepared by rubbing together 32½ gr. of arsenious acid, 76¼ gr. of pure iodine, and 100 gr. of mercury, moistened with a little alcohol, the trituration being continued until the mass has become perfectly dry). To this is then added hydriodic acid, of which a quantity corresponding to 32½ gr. of iodine is mixed with four ounces of distilled water. The product is shaken up with three more pints of distilled water, and boiled down till a liquid is obtained, weighing 1300 grains. This is given in a mixture which contains a drachm of the solution and half an ounce of syrup of ginger to three ounces of distilled water, and of which three tablespoonfuls are given daily.

Pearson's solution (consisting of one grain of arseniate of soda to an ounce of distilled water) 15 drops three times daily.

Asiatic pills (prepared by mixing 66 gr. arsenious acid and 9 dr. powdered black pepper with gum-arabic and water, to make 800 pills). In most instances it is sufficient to give three pills daily, the best time for the patient to take them being immediately before dinner; but in obstinate cases the quantity may be gradually raised to twelve pills daily. Arsenic is freqüently more easily borne when administered with opium, thus we prescribe 1 grain of arsenious acid and 4 grains of opium to be mixed with sufficient soap to make 16 pills, two of which may be given in the morning, and two in the evening.

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* Majer Alni (Würtemberger Correspondenzblatt xxx. 13, 1860) describes the condition of the urine during the administration of arsenic, and refutes the statements of Orfila and Bonjean, the first of whom found traces of arsenic in the urine four or five days after the suspension of the treatment, the latter after one month. Majer adopted the following method of investigation:—the precipitate obtained by passing sulphuretted hydrogen into the urine, was washed with hot and luke-warm water; half was then treated with sulphuric acid in order to destroy the organic matter, and with nitrate of potash for the complete oxydation of the carbon; the other half was mixed with the nitrate and detonized in a porcelain crucible. The white mass again treated with sulphuretted hydrogen and the yellow precipitate (deposited after twenty hours) was subjected to the reduction method of Fresenius. Traces of arsenic were thus distinctly observed.

Lipp, of Graz (Arch. für Dermat. 3, Heft), obtained good results with arsenic in the form of subcutaneous injection (*Coque acid arsen. gr.* 4-8 *cum aq. destil ut. f. solut ponderis unciæ*) one-tenth gr. daily. The mass of scales around the infiltrated patch increases, and the eruption subsides and becomes paler. The general symptoms, which, however, are transitory, are heat, loss of appetite, thirst, diuresis, headache, giddiness, etc. Lipp claims for this method the advantage of being rapid in its effects, and unattended by disorder of the stomach.

Sims (British Med. Journal, 1869) recommends the balsam of copaiva (10-20 *gr. c. Mucil. g. Arab. liq. potass carb.*).

The internal use of *carbolic acid* (*dr.* 1 *cum ext. et pulv. acor.* in 60 pills) in the treatment of psoriasis was suggested by Lemaire and Bazin. According to my experience this remedy acts in diminishing the hyperæmia. As we also find thickening and new growth in psoriasis, the action of the drug is usually observed only at an early stage, whilst later, the disease is not influenced even when large doses are given, as the carbolic acid has no effect on the thickened tissues. It is on this supposition that I explain the success which attended the use of this drug only in the acute forms of psoriasis (punctata, guttata), in which the thickening is inconsiderable, whilst in the chronic varieties, I have never succeeded in curing a case, although I administered large doses during a period of more than six months. M. Kohn (Arch. f. Derm. 2 Bd.) has recorded favourable results from the use of carbolic acid in psoriasis. From my experience, I prefer to employ the remedy (with necessary precautions) in the same way as arsenic in obstinate cases, only as an adjuvant to the local treatment. In employing the drug in large doses we must always remember the possibility of inducing certain morbid changes (fatty and granular degeneration of the hepatic cells and renal epithelium). The apparent action of this remedy in psoriasis, induced me to institute the following experiments (Arch. f. Derm. u. Syph., 1869); I selected the frog's foot for observing the phenomena: on giving the animal a very small dose, there is observed increased rapidity of the capillary circulation, which is lasting, whilst from large doses, this effect is apparent only at first, the circulation soon becoming slower, until stasis takes place, and in the distant parts complete anæmia is observed.

Local treatment. *Water*: warm or cold baths (Priesnitz's method). In order to soften and loosen the scales, various methods are employed: baths (at a temperature of 90-100° F.) in which the patient remains for several hours, or the "continual bath;" the result may also be obtained in a more agreeable manner by resorting to such watering-places as Gastein, Ragatz, Pfeffers, and Louèche in Switzerland, Mehadia, Baden near Vienna, and Aix la Chapelle. The method recommended by Priesnitz—that of "packing," douches and frictions,—is similar in its action to warm baths.

*Potash-Soap** is used in slight cases of psoriasis, especially in children, like ordinary washing soap, or is rubbed in with water and allowed to remain on the skin. This method (soap cure) is suitable in cases where the eruption is extensive and the patient keeps his bed. The treatment consists in rubbing in the soap by means of flannel or a brush over the whole body, the patient being then wrapped in blankets, or more conveniently covered with woollen shirt and drawers. During the first six days the patient is thus treated twice daily; on the seventh, eighth, and ninth, once, and is allowed to take a bath only on the fourteenth day. The later the bath is taken, the more easily is the soap removed, and the less also is the tension of the skin; if the patient take the bath at an earlier period, this latter symptom becomes so marked as to produce a feeling as if the skin were too tight for the body.

In psoriasis of the hairy scalp and face, we apply a solution of potash soap in alcohol (*Spiritus saponis alkalinus*) as used by Hebra,† this being washed off by means of the warm douche, and rubbing with flannel or rough towels.

Tar is used in three forms, as *Oleum Fagi*, obtained from *Fagus sylvatica; Oleum cadini*, from *Juniperus oxycedrus; Oleum rusci*, from *Betula alba;* the last is more expensive, and although possessing a more agreeable odour, is not more powerful than the other forms. In the employment of tar it is necessary to pay due attention to its local as well as general action. The local effects rapidly appear, sometimes in the form of a dermatitis, which may extend beyond the limits of the part. The general symptoms arise only when at least a third part of the cutaneous surface has been thus treated; these are:—intense fever, headache, vomiting of a dark fluid, evacuation of black fæces, and excretion of dark coloured urine. Although these symptoms arise in a few cases, the beneficial effects of this remedy are so great that we must not thereby be deterred from its further employment. The excretion of dark urine is not attended with any further effects, and always occurs after the application of tar to a large portion of the skin; the urine is always darkest at first, and gradually becomes lighter in tint. As regards the mode of application, a brush made of long bristles is dipped in tar and rubbed forcibly into the skin so as to saturate the follicles. Tar is employed either alone, or in conjunction with other remedies, as in *tar-baths* (Hebra); the affected part having been previously rubbed with tar, the patient is placed in a warm bath for four hours daily until the cure is completed. In cases in which we are desirous to avoid the injurious effects of tar, it may be combined with an equal proportion of cod-liver oil; with alcohol or ether when applied to parts covered with hair, so that it may rapidly dry. As tar is a useful remedy in other skin affections, its combinations with other agents will be described in due course. The odour is disagreeable, as well for the patient as those around him, and may be corrected by adopting the following mixture:—

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* *R. Lixivii caustici saturati (pond. spec.* 1.333) *partem unam. Adipis ceti. partes duas.* In its preparation, hog's lard, cod-liver oil, or cocoa butter may be employed.

† See formula, p. 59.

℞. Ol. Rusci ℥j.
Aether. Sulph.
Sp. Vini Rectificat. a.a. ʒj.
Ol. Lavand. Rutæ
Ol. Roris marinæ a.a. gtt. xx.

The products of distillation of tar are to be preferred on account of the colour; these are especially *Naphthalin* or *Resineon* and carbolic acid, which we have already described.

Solutio Vlemingkx (*R. Calcis Vivæ, Oss; Flor. Sulphur., Oj; Aquæ Oss; Coque ad remanentram librarum duodecim, dein filtra*). This process yields a dark-brown fluid, which should be applied by means of a piece of flannel, pumice-stone, or brush, the patches of psoriasis being rubbed till slight bleeding takes place. As this method is painful, it can only be applied to small portions of the skin. *Unguent Rochardi.* (*R. Iod. puri gr.* vii. *Calomel gr.* xx. *Leni igni fusis adde: ung. simpl.* ʒij.) This ointment is applied as long as vesicles continue to be formed around the patches of psoriasis. *Unguent Helmondi.* (*R. Hydrarg. ppt. alb.* ʒj. *Ung. simp.* ℥j.) is especially useful in psoriasis of the scalp and face; and a more rapid effect is produced by combining this with bismuth (*Hydrarg. ppt. alb. Magist. Bismuth a.a.* ʒj. *Ung. simpl.* ʒij. *M. fiat ung.*) For allaying the itching a modified form of Wilkinson's ointment and resineon have recently been recommended by Hebra. Wilkinson's ointment, like the potash soap, is rubbed in daily for a period of several days, and while this is going on, the patient should be enveloped in blankets. Resineon* is similarly used in the following formula:—

℞. Resineon
Petrolei a.a, ℥j.
Sapon. Virid.
Axung. porc a.a. lb.
Pulv. pumic. q. s. ut f. unguent.

Dr. Passavant, of Frankfort, recommends animal food exclusively for the cure (?) of psoriasis, and regards all other means as unnecessary: the diet should consist of milk, pork and other fatty articles. Under this treatment an obstinate case of psoriasis, accompanied by bronchitis, was completely cured. Passavant believes psoriasis to be due to imperfect elaboration of blood, the morbid development of scales on the integument being associated with increased formation of epithelium on the bronchial, nasal, and gastric mucous membranes: these morbid conditions yield to his treatment (Archiv. für Heilkunde, 1867).

As a summary of the treatment, therefore, in cases of psoriasis punctata, or guttata, we shall rely chiefly on the administration of arsenic, employing local treatment as an adjuvant in obstinate cases. In psoriasis of the scalp and face, frictions with Spiritus saponis alkalinus, in conjunction with white precipitate and bismuth ointments: for psoriasis in children, also, these remedies are most successful. The choice of other methods will depend upon the varieties in the distribution of the disease, and upon the occupation of the patient: thus, for instance, when the affection is extensive, tar-baths (for four hours) every night, should be prescribed; and again, when the patient can devote time to the treatment, the complaint may be removed more rapidly by the "soap cure." In obstinate cases, frictions with Vlemingkx solution are indispensable. Rochard's ointment is only somewhat more powerful than the white precipitate.

By such measures we cause psoriasis to disappear, even in the most severe cases, for, although we are unable to prevent relapses, timely and well-directed treatment is successful in arresting the progress of the disease.

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* Resineon is a volatile liquid, colourless when fresh (dark when exposed to the air), which was first obtained by Pereira from the distillation of tar; it is rapidly absorbed into the system, as is indicated by the odour of the urine.

2. PITYRIASIS RUBRA.

In the diffuse form of eczema, which we have already noticed, wide tracts of the skin appear reddened, and covered with crustaceous lamellæ or scales,* but there is no excoriation or itching: this variety has been described as a distinct disease, and termed pityriasis rubra. It is a rare disease, attacking mostly the trunk or entire cutaneous surface, and is distinguished by its obstinate nature and tendency to relapse. Hebra classes this affection with eczema, and the accuracy of this view is borne out by the fact, that we sometimes observe, in such cases, excoriated and moist patches on isolated parts of the skin, as the flexor surfaces of the extremities.

The same principles of treatment apply to this as to the other forms of acute and diffuse eczema.

Papular Inflammatory Affections.

1. LICHEN (*Knötchenflechte*).

The term lichen was applied by the ancients to the most varied forms of skin disease,—eczema, impetigo, mentagra, etc. being grouped under this designation. Galen and Hippocrates thus describe lichen:—"lichen est summæ cutis vitium ut psora et lepra cum asperitate et levi pruritu, psora autem et lepra levius:" this definition, however, does not accord with the modern views of the disease.

Willan defines lichen as "an extensive eruption of papulæ, affecting adults, connected with internal disorder, usually terminating in scurf, recurrent and not contagious." He enumerates five† varieties. (1, L. simplex; 2, L. agrius; 3, L. pilaris; 4, L. lividus; 5, L. tropicus). The description of *L. simplex* or agrius, as given by this author, accords more with eczema. *L. pilaris* is not to be regarded as a distinct species, as it indicates merely an eruption of papulæ, appearing chiefly on the extremities, the epidermic masses being firmly adherent to the hairs which appear bent. This form occurs mostly in people who seldom use baths. *L. lividus* is a scorbutic affection, and is due to a hæmorrhagic exudation, by which the epidermis is elevated in the form of papulæ. Willan includes petechiæ and vibices in the same category. Wilson describes *L. planus*, which he further subdivides into *L. diffusus, annulatus*, and *marginatus*; it is identical with *L. ruber*, which he does not regard as malignant.

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* From the excessive formation of scales the disease has been thus classified.

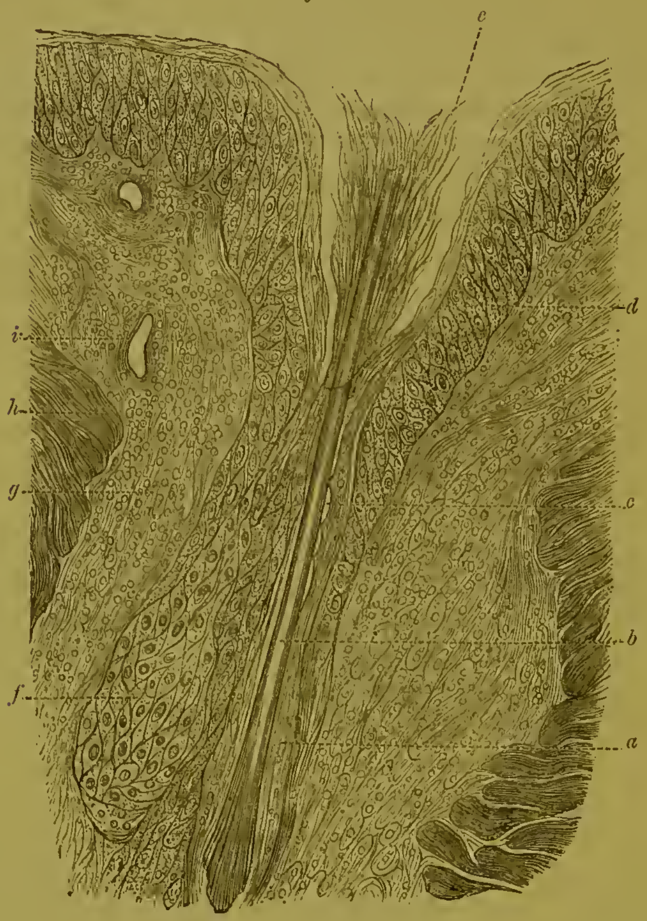
† Willan enumerates seven varieties:—1, L. simplex; 2, L. pilaris; 3, L. circumscriptus; 4, L. agrius; 5, L. lividus; 6, L. tropicus; 7, L. urticatus. Tr.

Hebra has given a precise meaning to the term lichen, and bases the distinctive character not merely on the papules, but rather on the morbid condition associated with their formation; he describes two varieties: *L. scrofulosorum*, which occurs chiefly in strumous subjects, and *L. exudativus ruber*, in which the papules present characteristic peculiarities.

1. *Lichen scrofulosorum* is an eruption of miliary papules (rarely exceeding the size of a pin's head) of a brownish-red colour, and seated at the apertures of the follicles. These papules occur in groups, covered by thin and easily separable epidermic lamellæ, forming circles, or segments of circles, on the chest and back, as also on the abdomen and inguinal region, and more rarely on the extremities: in children, I have seen them even on the face and hairy scalp. In many cases the affection is associated with *acne disseminata*; the pustules which are observed, especially around the genitals, originate as lichen nodules, and their development may easily be traced, particularly in the case of children. Such patients present the general symptoms known as "strumous:"—enlargement and ulceration of the lymphatic glands, periostitis, caries, necrosis, etc. The affection occurs most frequently in children, and may be associated with congestion of the apices of the lungs,—a complication which I have not observed in adults.

When the disease is left to its spontaneous course, it disappears after a time, but shows a tendency to relapses: the papules attain only a limited size, and gradually disappear, leaving a few minute scales to indicate the seat of a former eruption, on the shedding of which, merely a pale brownish pigmentation remains. The affection gives rise to no itching, or other unpleasant sensation. Children are more liable to L. scrofulosorum than adults: in the former, there are certain differences in its mode of origin. In regard to its frequency, in 100 cases of skin disease in adults, there are 0.3 cases of lichen; in 100 cases in children, 0.5; consequently two-tenths more. Children under the age of two years are liable to lichen, the eruption appearing in the form of groups, mostly on the trunk, but also on other parts of the body, as the extremities. In one case which came under my observation, the entire cutaneous surface, with the exception of the legs, was involved; the patient was a girl 4½ years of age, in whom the brownish papules were grouped in the form of circles or segments of circles, covered with thin epidermic scales. In this case there was no perceptible enlargement of the sub-maxillary or other glands, nor any of the symptoms of struma or of tuberculosis of the mesenteric glands, but at the apices of both lungs there was distinct tubercle, and this latter condition is the more remarkable

Fig 19.



Lichen (Figure after M. Kohn. Sitzungsber. d. kais. Akad, 1868). *a.* Hair follicle. *b.* Hair. *c.* Root-sheath of hair traversed by cells. *d.* Rete mucosum thickened, cells longitudinally displaced; exudation cells between them. *e.* Epidermic mass at aperture of follicle. *f.* Sebaceous gland. *g.* Cells around sebaceous gland and hair-follicle. *h.* Adjacent normal cellular tissue. *i.* Blood-vessel.

as in the fifty cases of the disease in adults, which are given by Hebra, there was not one which showed infiltration of the lung. This and similar cases deserve notice, as the majority of children as well as adults, affected with this skin affection, have suffered from struma or from tuberculosis of the mesenteric glands. In children, groups of lichen papules sometimes appear on the extremities, whilst the trunk is completely free of the eruption; in adults they occur on the extremities only when the trunk is involved. *Lichen lividus, i.e., purpura* sometimes appears simultaneously with L. scrofulosorum on the lower extremities.

Anatomy. According to the researches of M. Kohn, the anatomical changes in L. scrofulosorum, are essentially as follows:—exudation cells in and around the hair follicle and sebaceous gland, which are first seen around the vessels, and in the meshes of the areolar tissue at the fundus of the hair follicle and sebaceous gland, and later, within these structures; lastly, they accumulate to such an extent in the interior of these structures that the enchyma cells of the sebaceous gland are thrust towards the aperture, and the root-sheath of the hair separated from the wall of the follicle. At a later stage of the morbid process, the hair follicle becomes distended by the accumulated cell mass. The lichen-papule, therefore, is formed by a cell infiltration of the papillæ around the follicle, and the central scale by a collection of epidermis at the widened orifice of the follicle.

Treatment. As a specific in this disease, cod-liver oil is used both internally and externally. In employing the remedy locally, we must take care to apply a large quantity, and to keep it as long as possible in contact with the skin; this is effected by rubbing in the oil twice daily, after which the patient is enveloped in flannel sheets. In private practice, and in cases in which the patient is to go about during the treatment, he may wear tightly fitting woollen clothes, over which the ordinary linen is worn.

As an internal medicine, we prescribe the oil for adults, in the dose of from half an ounce to two ounces, and for children, half an ounce daily: larger quantities are not assimilated. With this treatment, we of course combine nourishing diet of meat and such-like.

2. *Lichen exsudativus ruber (Schwindflechte)* is an eruption of pale-red papules, which are at first distinct from one another, but later, become more closely aggregated, involving at length the greater part of the cutaneous surface, and producing atrophy of the skin. The disease appears in the form of separate papules (of

the size of a pin's head), which are covered with white scales, or marked by the depressed outlet of a follicle. As the result of the continued formation of fresh papules, wide tracts of the skin are covered, and the epidermis breaks up into thin scales, which are of a white or greenish colour. The papules, unlike those of psoriasis, never undergo peripheral growth, the disease always spreading by the development of new papules. When the disease has lasted some time, the scales gradually become loosened and thrown off, the subjacent cutis appearing thickened and infiltrated, as well as dry and brittle from the loss of its elasticity. On the skin of the face the lines and furrows are obliterated, and the expression is lost. The skin is greatly thickened on the palm of the hands, the flexures of the joints being marked by deep fissures, and movement (if still possible) gives rise to severe pain; usually the joints are not moveable, and are kept in the half-flexed position. The nails are thickened by the growth of yellowish-brown nail-substance, which is gradually loosened, and replaced by fresh deposit. The hair of the head, as well as that of the pubes and axillæ, remains unaffected, but forms on other parts of the body, a mere lanugo.

Lichen ruber is attended with no discomfort so long as it is limited, but as the eruption increases in quantity, itching and severe pain supervene. The affection is chronic, and frequently has a duration of several years: we remember only one case which terminated fatally in three months. When the disease is extensive, the nutrition of the body becomes impaired, and the patient succumbs to general marasmus. Happily, lichen ruber is a rare disease, only twenty cases having come under observation at the Vienna school; I have seen six of these cases. As to the cause of the affection, our knowledge is still uncertain.

*Anatomy.** On microscopic examination of lichen ruber, Hebra found a morbid change in the root-sheaths, which, instead of being cylindrical as in the normal condition, were funnel-shaped, with the small end downwards. Besides, there was found hypertrophy of the papillæ, and dilatation of the small blood-vessels in them. Hillier observed that some of the hairs exhibited under the microscope, a fibrous fracture; the scales of the cuticle were found to be infiltrated by numerous globular bodies, resembling spores, strongly refracting the light, and insoluble in ether or liquor potassæ. Prof. Hebra afforded me an opportunity of examining portions of the skin of a patient suffering from lichen ruber. Having selected for investigation a piece of the skin of the back, which was covered with numerous papulæ, the specimen was hardened and sections made, some of which were treated with acetic acid alone, others with a solution of carmine in ammonia and acetic acid. With the view of comparing the structures, I excised corresponding portions of the normal skin of the dead subject. The results which I thus obtained are comprised in the following summary:—

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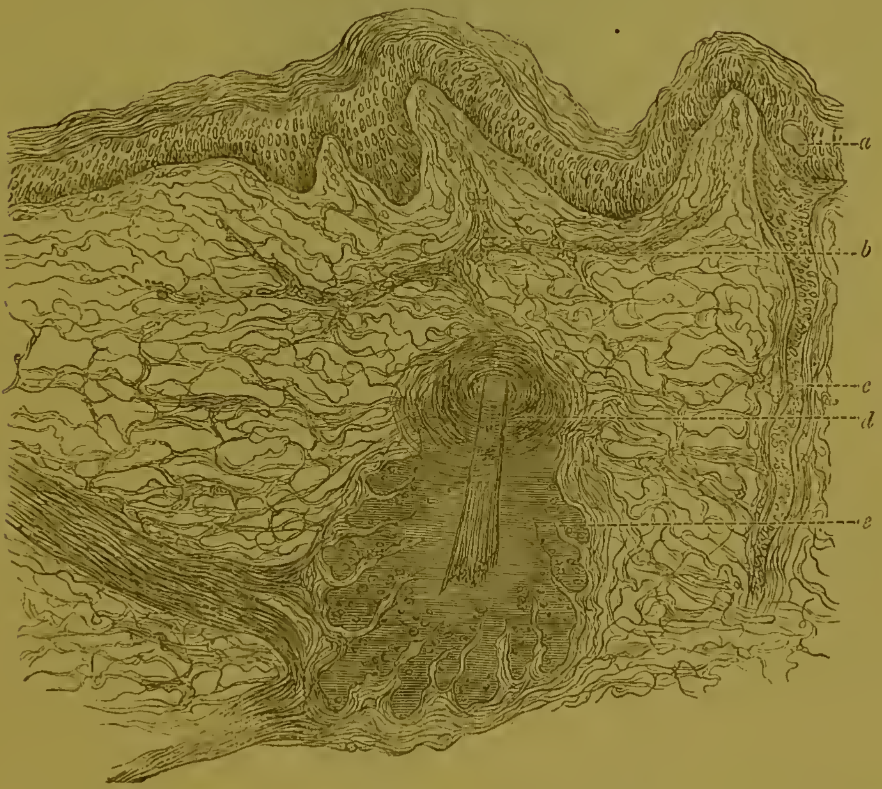
* See Hebra's Pathologie u. Therapie der Hautkrankheiten, p. 320; also Hillier's researches in *Lancet*.

The morbid changes involve the greater parts of the layers of the skin and their appendages. The epidermic cells, which appear filled with fine granular masses, are piled up in large numbers; those of the rete Malpighii are, in some sections, accumulated, in others they are seen to send broad prolongations between the papillæ around which brown pigment cells are aggregated. The papillæ are enlarged, and display in their interior wide-meshed elastic tissue fibres, which here, as in the entire corium, are more abundant than in the normal condition. The large and small

Fig. 20.

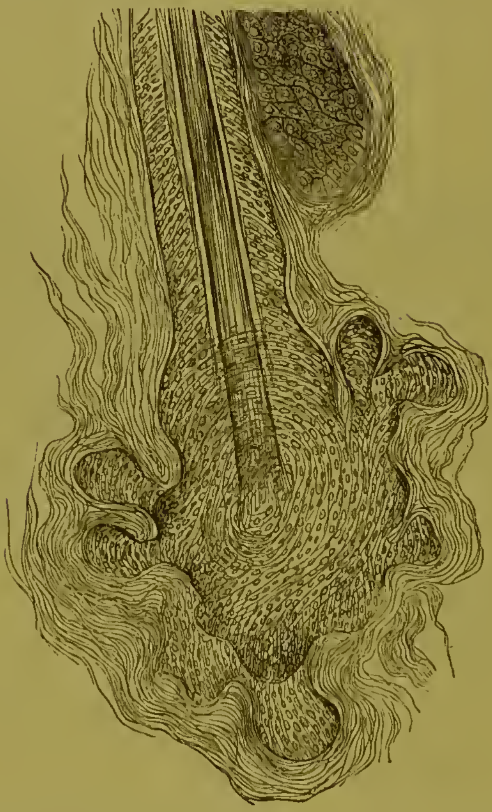


a. Widened excretory duct of sweat gland. *b.* Dilated vessels with cell-proliferation. *c.* Cellular contents of excretory duct of sweat gland. *d.* Hair. *e.* Distended hair-follicle with muscles.

vessels and their offshoots (in the papillæ) are dilated: in the deeper layer of the corium the arteries and veins appear tortuous. Cell-proliferation is observed along the course of the vessels, which, on transverse section, are seen to be greatly distended, filling up the stroma of the papillæ.

The sweat glands and panniculus adiposus present little deviation from the normal condition; the excretory ducts and orifices of the glands, however, appear expanded (funnel-shaped) and filled by heaps of epidermic cells. So little is seen of the sebaceous glands that their condition cannot be determined; they are probably destroyed. The most interesting change, however, is seen in the outer root-sheath of the hair. This structure, as is well-known, consists, in the normal condition, of nucleated cells, which are aggregated in greater numbers around the hair-shaft than at the base of the follicle (at the root): in this disease the opposite

Fig. 21.



Hair with enlarged root-sheath: thickened hair-follicle with club-shaped dilatations. Sebaceous gland.

condition is found, these cells being accumulated in greatest number at the base of the follicle, where they form regular conical plug-shaped processes, which give the entire root-sheath the aspect of an acinous gland.

The hair-follicle is distended by the cell-accumulation within it, but presents no other striking morbid change. I found, moreover, that the root of the hair, presented at its base the appearance of having been cut off; it was softened, and resembled a pencil-brush; at the upper part of the hair-follicle, the cells of the outer root-sheath are also accumulated in larger numbers. It may be concluded that the cell mass at the base of the hair-follicle is formed not only by the cells of the outer sheath, but also by those of the inner sheath and cortical substance of the hair, as all these come into contact at that point. Further, the condition of the smooth muscular fibres is remarkable: they occur very abundantly, forming interlaced fasciculi or strands of considerable width, which extend towards the papillæ as well as the deepest layer of the corium (even to the sweat glands), so that we are led to the conclusion that there is a hypertrophy of these fibres in this disease; and this view is confirmed by the fact that in twenty-five preparations taken from corresponding portions of the skin in healthy subjects, there was only one in which these muscles showed such development. In other skin affections, as icthyosis, chronic eczema, elephantiasis Arabum, etc., I have repeatedly observed a similar development of these muscular fibres.

Treatment. This disease is materially influenced by the administration of arsenic in large doses during long periods: on the suspension of the remedy, however, relapses sometimes occur. Local treatment produces an improvement when the affection is seated on the hands or feet; it consists in the inunction of oily matter or ointment (*Emplast. Diachyl. simpl. liquefacti olei lini a.a. part. æq.*).

2. PRURIGO (*Juckblattern*).

Prurigo is a chronic skin affection, characterised by intolerable itching, and by the development of papules, as large as hemp seeds, of pale-red colour; from being scratched at an early period, these papules are marked by blood-crusts of a brownish colour. Besides these superficial papules, which are always isolated, there are also deep-seated ones which are recognised only by the sense of touch.

As the result of the continued scratching, wheals arise,—especially in the case of young people in whom the skin is more delicate—and the affection is characterised by papules and wheals. When, however, the disease has lasted some time, secondary phenomena appear: the skin becomes thickened and dark-coloured, or pustules may be formed, which dry up into crusts, and thus the cuticle may be detached in larger or smaller lamellæ. When these pustules and crusts occur in large numbers on the lower extremities, the inguinal and crural glands become swollen; the lines and furrows are deepened, the general surface of the skin being rough, hard, and dry; and hairs also being torn out by the scratching. The affection occurs chiefly on the extensor surfaces of the upper and lower extremities, also on the trunk, and rarely on the face: even in severe cases the flexor surfaces of the elbow and knee-joints, the genitals, and the axillæ remain free of the eruption. On passing the fingers firmly over the skin affected with prurigo (as on the extensor surfaces of the lower extremities) we experience a pricking sensation (Hebra). When the affection is slight, it is termed *prurigo mitis*, and when limited in its distribution, *prurigo partialis.*

Anatomy. The papules are produced by cell-proliferation in the papillary body, and by effusion of a structureless exudation, which raises the epidermis. The rete Malpighii and epidermis are stretched and diffusely pigmented (Fig. 22); and the spinous or furrowed cells (described by Schrön and F. E. Schulze) are seen to be largely developed as in other diseases associated with excessive formation of epidermis or epithelium. The corium and papillary body are hypertrophied and thickened by tense connective tissue, the outer root-sheath greatly developed, and the hair-follicle expanded (or sacculated). Further investigations are required to prove that the disease may not be caused by anatomical changes in the nerves of the skin.

R. H. Derby, of Boston (Sitzungsb. d. kais. Akad., 1869) has investigated the changes in prurigo, and finds that each papule is perforated by a hair, the outer root-sheath of which displays a prolongation only at the point of insertion of the arrector pili, but I can assure Dr. Derby that these prolongations (which were first described by me *) occur at those parts of the hair-follicle situate above and beneath the arrector. As I have observed, the dilatations (Ausbuchtungen) as well in lichen ruber as in prurigo, and in the senile skin, appear to me to be only folds of the hair-follicle which have been distended by the accumulated cell mass of the root-sheath: these folds which arise from the shrivelled condition of the cutis, present on section the appearance of club-shaped processes. Derby also found hypertrophy of the smooth muscular fibres (such as I have described in lichen, elephantiasis, etc.; see p. 183). The hair itself is more perpendicularly placed, and displays numerous round glistening cells around the root and shaft; the blood-vessels of the follicle and of the corium and papillæ are distended; the connective tissue fibres are well defined and interspersed with loculi, in which round exudation cells are seen (Fig. 23). The formation of loculi is due to a serous exudation, which distends the lymphatic channels. In the most inveterate cases,

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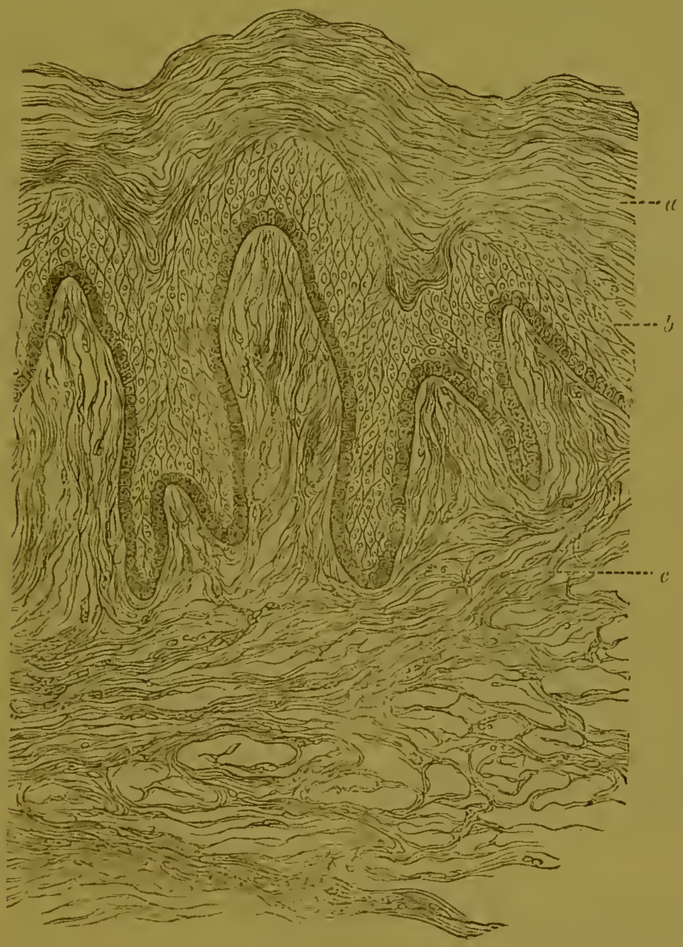
* Lehrbuch der Hautkrankheiten 1. Aufl.

Fig. 22.



Section of pruriginous skin from leg: *a.* Epidermis. *b.* Pigmented rete Malpighii. *c.* Thickened corium with enlarged papillæ.

Derby found changes similar to those which I have detailed and delineated (Fig. 22).

Etiology. As our knowledge of the origin of this disease is still imperfect, we may simply record the various problematical causes; these are:—certain articles of diet, deficient excretion of urine, diseases of the nervous system, or of the blood (the corpuscles being chiefly concerned); Hebra explains the phenomena by supposing that the inter-cellular fluid (blastema on which the nutrition of the epidermis depends) collects above the normal quantity and acts as a foreign body by raising the layer of epidermis which covers it, and irritating the subjacent papillæ.

Fig. 22.

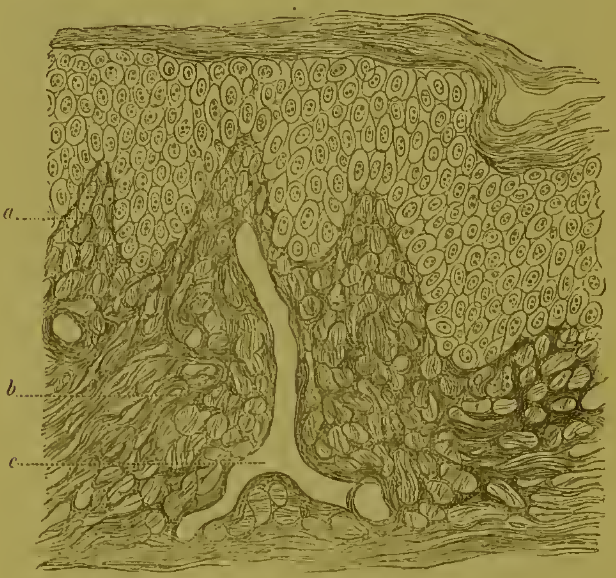


Figure (after Derby) *a*. Oedematous papillæ of prurigo papule. *b*. Loculi between connective tissue fibres. *c*. Distended-blood vessel.

Cazenave regards prurigo as a hyperæsthesia of the skin, which is only incidentally associated with a papular eruption. In strumous children prurigo occurs not infrequently as the result of chronic eczema.

Bärensprung places prurigo amongst the dermatoses in opposition to Cazenave, Romberg, and others, who regard it as a neurosis. According to Bärensprung the sensibility of the cutaneous nerves may be diminished (anæsthesia) or increased (hyperæsthesia). There is also a double variety of anæsthesia (loss of susceptibility to touch or pain); if this be due to an affection of the nerve trunk, it presents itself as neuralgia, *i.e.*, as pain; if it originate in an affection of the skin, however, it gives rise to the sensation of burning, cutting, pricking, or itching. This would appear to depend upon changes in the papillary layer of the skin, and hence is explained the itching which is felt only during the healing of wounds and ulcers, *i.e.*, when the growth of a new papillary layer commences. It is from this cause also that itching is most intense in those skin affections which arise from external irritation, as scabies and eczema; and in those which depend upon internal causes the itching is greater when the eruption is superficial; thus, phlegmonous and furuncular affections do not itch. The intense itching in prurigo may therefore be attributed to an affection of the papillary layer. If it were a neurosis there would be pain (following the distribution of certain nerves) and no itching. The papules appear gradually as minute, smooth eminences, accompanied, not with inflammation, but simply by a sensation of warmth in the skin. On tearing the summit of one of these papules with a needle, we may pull out a minute saccule, *i.e.*, an enlarged sebaceous gland, filled with heaps of cells. These itching papules, therefore, are not inflamed papillæ, but the swollen glands of the cutis, which are filled with epithelial cells instead of fat; hence the dry papery aspect and yellowish pigmentation of the skin in protracted cases of prurigo. This does not, of course, afford an explanation of the itching.

Diagnosis. The description already given of the characters of prurigo, will suffice for the recognition of the disease in the majority of cases. It is always necessary to examine the entire cutaneous surface, so as to found the diagnosis not upon separate signs, but upon the general appearance of the case. The disease with which it is most liable to be confounded is *scabies* of long duration, especially in cases in which the burrows have become obliterated; but such an error may be avoided by remembering that prurigo occurs preferably on the legs, the skin of which is thickened and scaly, the penis and scrotum being free of any eruption, whilst scabies is found chiefly on the genital organs. When prurigo has lasted a long time *diffuse eczema* frequently becomes developed on the pruriginous skin, as the result of the violent scratching; and the diagnosis is then rendered difficult. In such cases, suitable treatment must be adopted for the cure of the eczema, on the removal of which, the existence of prurigo is ascertained.

Prognosis. In adults prurigo is incurable; in young children it usually admits of cure. The prognosis therefore depends on the age of the patient, and on the duration of the disease. Any one who has had an opportunity of observing the greater frequency of prurigo in children (both those of rich and poor parents), than in adults (and these chiefly of the poorer classes), will admit the possibility of a cure in children, else the disease would appear more frequently in adults of the richer classes. It is therefore important to establish the diagnosis at an early period, and to warn the parents of the obstinate nature of the disease, and of the results of neglecting it; the treatment about to be described is then employed. This view of the possibility of curing the affection in children is confirmed by all physicians who are experienced in the diseases of childhood. In the prurigo of adults, the prognosis is always unfavorable; the disease may be alleviated, but never cured.

Treatment. The most important remedial agents in prurigo, are luke-warm baths, soaps, oily matters, sulphur, tar, and corrosive sublimate. In the selection of remedies, we are to be guided by the age and occupation of the individual, and by the form of the disease. In infants or young children, the daily employment of luke-warm baths is to be recommended; the affected parts, having previously been rubbed with soft soap, are to be cleansed, dried, and smeared with oil. If the children are badly nourished, inunction with cod-liver oil may be resorted to, as experience has shown that the nutrition is thus greatly improved, although the mode in which the remedy acts is uncertain. In the case of stronger children, an ointment composed of spermaceti and olive oil, may be applied. These substances are rubbed in twice daily, and after each inunction the patient is enveloped in woollen clothes, over which the ordinary linen is worn. When the pustules and crusts occur in large numbers, and when the patient remains in bed, the "cod-liver oil packing" or the "soft-soap cycle," tend to diminish the infiltration of the skin. Vlemingkx's solution is a suitable application in the dry form of prurigo (papules with slight desquamation); the solution is rubbed in during a bath, after which the skin is treated with a preparation of tar. Corrosive sublimate baths (2 drs. pro-balneo) are useful in cases in which the pustules and crusts are abundant; as also Wilkinson's ointment, which should be applied during ten days. The method of simply painting the skin with tar, and afterwards placing the patient in a bath for three or four hours (tar-baths), has also afforded good results; also soda-baths (2 lbs. pro-balneo). By such means the disease may be temporarily alleviated in adults, and in infants and children the cure is effected; but the baths must not be discontinued for some time after the skin has become clean. In this disease, as in psoriasis, certain mineral springs, as Baden, Aix la Chapelle, Mehadia, Leuke, and Kreuzenach, afford temporary relief.

Bärensprung opposes the use of irritating remedies in the treatment of prurigo, and finds local anæsthesia (chloroform) equally useless. Cold water in baths and bandages, relieves the symptoms; luke-warm, mud and vapour baths also diminish the irritation. He believes the most efficacious means of relief to consist in the inunction of oil and fatty matters. As special medicines, he mentions the preparations of sulphur, tar, and corrosive sublimate. Indeed, slight cases of prurigo are often cured by sulphur baths and ointment: in obstinate cases, he obtained excellent results by corrosive sublimate baths: the patient takes a bath (at 95° F., containing 2 drs. of corrosive sublimate) every other day, or at longer intervals. For this purpose only baths made of wood can be employed, as zinc or copper would be injured by the chemical action, and the curative effect of the bath also impaired. It is affirmed that six of these baths usually suffice for the complete cure of the disease (?). The action of the drug is chiefly local, for the absorption is very slight.

Bellencontre recommends petroleum in combination with alkaline baths for the treatment of prurigo. (*Petrol grm.* 120, *Ol amygd. grm.* 125, *Tinct. op croc. grm.* 6). Lemaire and M. Kohn advocate the internal use of carbolic acid.

C. TRAUMATIC INFLAMMATORY AFFECTIONS.

Under this designation we include all inflammatory affections which are caused by mechanical, chemical, and caloric agencies, the peculiarities of which consist in their mode of origin, and therefore solely in the etiology, the course and termination being similar to those of other inflammatory diseases.

a. *Dermatitis traumatica* is produced mechanically by concussions or other injuries, which cause hyperæmia, exudation, extravasation and inflammatory swelling of the skin; the so-called *erythema traumaticum,* which frequently arises from the pressure or friction of clothes, bandages, etc., affords an example of this condition, being merely a transitory redness of the skin, disappearing as soon as the cause is removed. Hyperæmia is not therefore to be regarded as a distinct affection, as the term erythema traumaticum indicates rather an inflammatory process, involving circumscribed portions of the papillary layer, and usually attended with serous exudation. To this group belong *inflammatory œdema,* as well as the eruption of superficial vesicles and blebs arising from long-continued pressure: *e.g.,* on the hands of rowers, on the feet from tight boots, and on the upper part of the thigh from badly-fitting trusses. All these inflammatory affections, even when causing loss of substance, heal without the formation of cicatrices. In this category also, are included those chronic erythematous affections which are produced by protracted friction and pressure (as the result of the occupation) in various individuals: for instance, in writers, on the extensor surfaces of the elbow joint; in shoemakers and tailors, on the buttocks; also on those parts of the skin where pressure is exercised by the clothes, as in women on that part of the loins where the garments are secured. This chronic inflammatory process induces permanent hyperæmia and infiltration of the cutis, and is of interest to the dermatologist as many forms of efflorescence (*e.g.*, variolous and scabious pustules) occur in larger numbers, on such parts, which are also the favorite seat of acari and pediculi.

Excoriations are losses of substance, which are produced by the scratching of the nails, involving either the epidermis, the rete Malpighii, or even the corium. At such parts the surface appears moist, the epidermis is shed in scales, or the exudation desiccates in brownish-red, or (when mixed with blood) black crusts. The form of excoriations varies in different skin affections, and always indicates the way in which the scratching has been performed; for instance, in scabies the excoriations are mostly minute and roundish, corresponding to the papules which occur chiefly on the upper half of the body; in prurigo, the excoriations are of the size of a pin's head, round and brownish-red in colour, corresponding to the destroyed papules which occur chiefly on the extensor surfaces of the extremities. The excoriations arising from the presence of pediculus vestimentorum differ in character, few being produced at first, whilst at a later stage, the individual (infested with pediculi for a long period) scratches the skin until it bleeds, thereby producing numerous crusts (roundish or linear in form, brownish-red or black in colour); these crusts when thrown off, leave losses of substance in the corium, which are later replaced by depressed, colourless and glistening cicatrices. These excoriations occur extensively on the shoulders, neck, and loins, viz.:—on those places where the pediculi remain in the folds of the under clothing. As the result of repeated hæmorrhage, the colouring matter of the blood (hæmatoidin) is deposited, and being gradually changed into pigmentary nuclei, produces brownish pigmentation of the skin of various shades.

The *treatment* of excoriations consists in removing, if possible, the cause of the itching, as the healing process then takes place spontaneously.

b. *Dermatitis venenata* arises from the action of various chemical agents, *e.g.*, vesicants,* which produce inflammation of the skin, accompanied by redness and swelling, as well as formation of vesicles and pustules.

e. *Inflammation of the skin from caloric agencies.* This group comprises *burns* and *frost-bite*, produced by extreme degrees of temperature. In these affections, the phenomena are essentially similar to those of the ordinary forms of dermatitis, being chiefly distinguished by localisation on the part directly injured. According to the intensity of the inflammatory process, burns and frost-bite present analogous phenomena. If the skin be reddened, swollen and hyperæmic, we speak of the *first degree* of burns and frost-bite;—if the epidermis be raised in the form of bullæ, the *second degree*;—and if the substance of the skin be more or less charred, the *third degree*. It is only in the course that burns differ somewhat from frost-bite, the former being usually acute, whilst the latter is chronic.

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* Naumann (Prager Viertel, Jahreschrift) has instituted important experimental researches on the action of epispastics, the employment of which as remedial agents is constantly decreasing in frequency: on section of the ischiatic nerve in the frog, the parts supplied by that nerve were subjected to irritation by applying electricity, warm water, etc. to the thigh. The effects were loss of tone of the general vascular system, retarded circulation, and impairment of the heart's action. Naumann obtained similar results in experiments on the human subject and on the bat; researches which were conducted with the sphygmograph, established the following results:—

1. The action of epispatics is reflex, and therefore dependent on the central organ. The action of the heart and vessels becomes diminished (pulsation, about one-third); slight irritation increases the activity. The effect of irritants, applied to the skin, continues some time after their cessation, *i.e.*, the more lasting extensive irritation has been, the more protracted are the effects in healthy subjects; from half an hour to three quarters of an hour after the cessation of irritation.

2. The weakening of the pulse, produced by powerful irritants applied to the skin, is often most marked during the irritation, but frequently lasts some time after its suspension.

3. The action on the skin of relatively weak irritants also continues for some considerable time after the cessation of irritation, but is also followed by relaxation; the latter, however, occurs much later, and in a much less degree, than after the employment of a strong irritant.

4. As the result of powerful irritation of the skin, the increased temperature of the body (which often continues half an hour after the employment of the irritant) is always succeeded by a lowering of the temperature.

5. The period of warmth varies in duration; the temperature is often lowered during the irritation, frequently, however, only after its cessation.

1. BURNS (*Verbrennung, Combustio*).

Burns may be produced by any source of heat (solid, fluid, or gaseous), the sun's rays, fire, heated or red-hot metals, hot or boiling fluids, gunpowder, and chemical agents. The effects vary according to :—

1. *Degree of heat;* molten metals are more destructive than boiling oils, and the latter more so than boiling water.

2. *Period of action;* the effects of a flame on the naked surface of the body are not so severe as that of burning clothes.

3. *Extent of action;* even slight burns extending over a large surface are usually more dangerous than those of a high degree limited to a small area.

4. *Consistency of hot fluids;* as thick fluids retain heat and evaporate slowly, the effects of their prolonged contact with the skin are more severe.

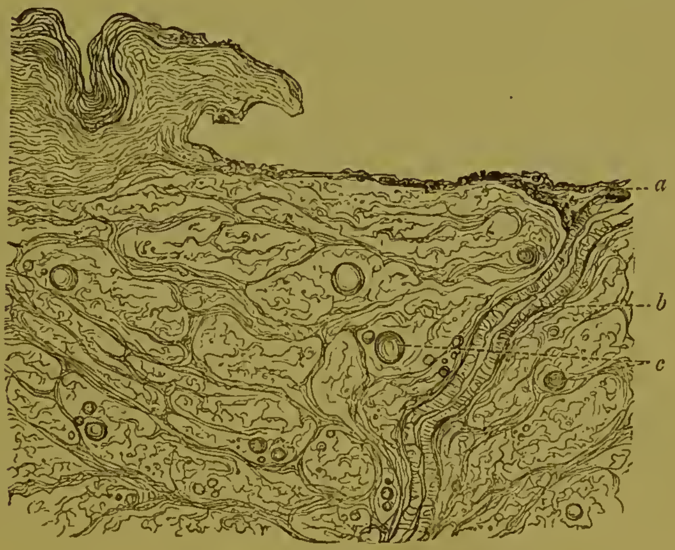
5. *Nature and functions of the affected parts and the constitution of the patient;* the effects of burns involving the transparent cuticle are different from those of similar extent on parts at which the skin is less tender; in the case of young, delicate, and irritable subjects, the general symptoms supervene more rapidly and severely than in grown-up persons who are healthy and vigorous.

First degree of burns. Hyperæmia of the skin is induced by the action of a temperature exceeding 100° F.; the higher the temperature, and the more prolonged its action, the greater is the tendency to exudation. On the withdrawal of its cause, the hyperæmia disappears, and is followed by desquamation of the epidermis: these morbid changes are frequently produced by hot water, the scorching rays of the sun, and such-like. The redness (accompanied by an intense burning sensation) resembles that of erysipelas, but is always limited to the part which has been acted upon by a high temperature.

Second degree. By the long-continued action on the skin of temperatures from 165 to 212° F., the epidermis becomes raised in the form of *bullæ* by serous exudation beneath it. The thicker the cuticle the slower is the formation of bullæ; at parts on which the epidermis is thin, the blebs which are rapidly formed (in from half an hour to an hour) soon burst, and the epidermis, torn from the subjacent cutis, appears shrivelled; healthy cuticle is usually reproduced within eight days or a fortnight.*

Third degree. When the skin is subjected to the continued action of heat (and if the temperature exceed 212° F.) coagulation of the albumen in the tissues takes place, and either the superficial layer or the entire cutis forms an *eschar.* The condition of the exposed cutis varies according to the depth to which the destructive process has extended, presenting a dull-whitish, brown, or black colour, and finally a moist or completely dry and brittle surface. The pain also depends upon the depth of the injury, and is most severe in cases in which the papillary layer has been only partially destroyed. The extent of the destructive process, however, can be ascertained only after the eschars have fallen off (*Billroth*). When the papillary layer still remains, the papillæ appear as red points on a white ground (rete Malpighii) and, in such cases, the growth of new epidermis is more rapid (from a fortnight to a month); if however the papillæ be also destroyed, the injured part presents a mesh-like aspect, the base of each papilla being invested by a white areola ("island"). In this case

Fig. 24.



Burn third degree. Two papillæ. *a.* Charred epidermis, rete Malpighii, and papillæ. *b.* Excretory duct of sweat gland. *c.* Scattered fat cells.

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* In fresh burns of the first and second degree, Biesiadecki (Sitzungsb. d. kais. Akad. 57 B. ii. Abth.) found enlargement of the vessels and exudation of serum as well in the cutis as in the rete mucosum, the young cells of which (connected with the cutis) are thus elongated, and finally assume the appearance of fine fibrils, in which the nuclei of the former cells cannot be distinguished.

also the healing process is rapid; and it is only when the entire papillary layer is destroyed that the reparation is greatly retarded, as the growth of new epidermis proceeds slowly from the periphery. The eschar exhibits various changes, according to the intensity of the destructive process; usually the epidermis, rete Malpighii and papillary layer are transformed into an uniform, dark, glistening mass, the corium being shrivelled. The sebaceous glands and hairs are destroyed, and the sweat-glands apparently more superficial: the fat-cells of the panniculus adiposus are emptied of their contents (fat crystals appearing at parts within the membrane) whilst the fat itself is scattered throughout the corium in minute granular masses. The course of the blood-vessels (which contain brownish masses of charred blood) is indicated by brownish-red streaks (Fig. 24). Lastly, the skin may become so charred as to be scarcely distinguishable from a cinder.

Prognosis. The morbid changes produced by burns vary with the extent of surface involved; thus burns even of the first degree, prove fatal when extended over two-thirds of the cutaneous surface, but usually heal rapidly when more circumscribed. In burns of the second degree, a favorable prognosis may generally be given, the only exception being when a large area is involved. Burns of the third degree are always dangerous when extensive, and in general terminate fatally when more than one-third of the cutaneous surface is injured; if however, minute portions of the affected skin have escaped destruction, the course may be more favorable. The fatal result is due to the complete loss of function over wide tracts of such an important organ as the skin, collapse being thus induced; the general symptoms resemble those induced by inhaling carbonic-acid gas. In such cases death ensues within 48 hours after the injury. On post-mortem examination we find congestion of the brain, lungs, liver, and kidneys. If the patient survive the primary effects, the fatal result is sometimes due to intestinal catarrh and ulceration, associated with severe febrile disturbance, which supervene after the lapse of two or three weeks; or to nervous shock, intestinal and renal hæmorrhage, or pyæmia at a later stage. The favorable or unfavorable course of burns (even those of limited extent) frequently depends on the prevalent epidemic.*

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* *Roser* describes four types of the healing process, according to the depth of the burn:—1. Simple reproduction of epidermis. 2. Mesh-like granulation with rapid formation of epidermis. 3. Granulation and cicatrisation extending from the deeper layer of the skin. 4. Granulation and cicatrisation with cicatricial

Treatment. In burns of the *first* degree the simple application of cold water is most useful; in those of the *second* degree the bullæ should be left intact as long as possible, as the covering of epidermis prevents the access of atmospheric air, which by acting on the exposed papillary layer would give rise to pain; or if it is necessary to evacuate the serous exudation, a small puncture may be made at the base of each bulla. When the corium is slightly exposed, the best application is the liniment composed of equal parts of olive oil and lime water. *Glycerine* has been recommended for the granulating stage of burns, but the pain is not relieved either during, or subsequent to its application. *Collodion* rather aggravates the pain, and when it dries, bright red granulations are observed beneath it. The preparations of *lead* have also been employed without any good results.

With the view of protecting the injured portions of the skin, Savage and Serain have suggested a varnish, composed of equal parts of collodion and castor oil; this is painted on the skin by means of a brush, and forms a white, elastic, semi-transparent coating, which resists external influences longer than any other dressing, and completely prevents the access of the air, acrid fluids, etc. During the first application the pain is rather severe, but very soon subsides, and is succeeded by a sense of relief. In all varieties of burns this method may be advantageously employed, and the frequency of the application will depend on circumstances,

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contraction extending from the exposed subcutaneous tissue. In the *first*, the healing process takes place in a short time, by the spontaneous growth of epidermis. In the *second*, the burns extend more deeply, forming an eschar, on the removal of which a granulating surface is observed, which presents a peculiar mesh-like aspect—minute red granulation points on a whitish (epidermoidal) surface. The deeper parts of the skin between the papillæ, or perhaps the hair-sheath, follicle, or sweat-gland still possess epidermoidal structures, which form a net-work around the separate granulations. The growth of the new epidermis from the very numerous points of the epidermoidal mesh-work extends over the small granulations, so that the healing process is comparatively rapid on the entire surface. In the *third*, the destructive process having extended more deeply, these epidermoidal remnants occur sparingly, and the healing process is consequently slower. After the removal of the eschar, the deeper layers of the skin undergo a process of softening and vascularisation; the granulations now forming receive an epidermal covering from the edges of the wound, which becomes denser after cicatrisation commences. In the *fourth*, the burn has involved the entire thickness of the skin, and the healing process takes place much more rapidly, and with greater cicatricial deformity, the subcutaneous tissue being less dense, and more disposed to contraction. Other factors are also to be taken into account, as inflammation of the adjacent parts, vitality of the subjacent tissues, and individual conditions, as blood poisoning, etc.

the object being to produce a complete and permanent covering to the affected parts.

In many cases the best method of treatment consists in painting the parts daily with a solution of nitrate of silver; the eschars thus produced prevent the irritant action of the air, and the cicatrices following them are usually pliant and less disfiguring than those caused by other remedial methods; and in burns of the face, as well as those involving the extensor and flexor surfaces of joints, this is a most important advantage.

In burns of the extremities *irrigation* is employed with advantage: the simplest method of carrying out this treatment is as follows:—the affected limb is laid on a wooden support (covered with wax cloth) projecting from the edge of the bed, on which is placed a vessel filled with luke-warm water, and having a spout provided with a stop-cock: when the stop-cock is turned a continuous stream of water flows over the injured surface. The advantages of this method are that the discharges are thus removed and purulent absorption prevented (?): the formation of new cuticle is accelerated, and the patient is spared the pain of changing bandages. The *continuous bath,* however, is much more serviceable; this in its simplest form, consists of a bath in which a mattress and horsehair pillow are placed: the *water-bed* of Hebra's construction is more convenient; it consists of a bath fitted with a frame to which are fastened transverse bands for supporting the patient, and attached to a rack-work so that the bed may be raised or lowered within the bath.

Under the treatment by the continuous bath, burns heal more rapidly and with less pain than by other methods, the only exception being very extensive injuries, the fatal effects of which are not thus averted. This plan of treatment, as we shall presently see, is attended with excellent results in chronic skin affections, in which cases it is employed either alone or in conjunction with remedial agents.*

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* In reference to the effect of baths on the condition and absorptive power of the skin, we may here record certain experiments. The researches of B. Ritter (Archiv. d. wissensch. Heilkunde, 1867 b. 2) have shown—1. That nitrogen and carbonic acid gas are transpired through the skin during the bath, provided the temperature be not so low as to impair the action of the skin; these gases therefore, being soluble, pass directly into the water of the bath. 2. The shedding of epidermis is rather mechanical than vital. 3. There is no excretion of albumen. The real products of excretion therefore are carbonic acid and nitrogen gas; albumen, salts, and epidermic scales being adventitious matters. The absorption by the skin of the fluid of the bath is due to endosmosis. The

Recently, oil baths have been recommended, as also envelopment of the part in cotton-wool. In burns of the hands and feet, the fingers and toes should be separated by strips of linen soaked in oil, so as to prevent adhesion of the opposed surfaces. In burns of the third degree (after removal of the eschar) the treatment is similar to that which we have just described.

2. FROST-BITE (*Congelatio*).

The effects of cold on the skin, which we designate with the term congelatio or frost-bite, vary according to its intensity and duration.* The primary action is contraction of the vessels, which, lasting some time, is succeeded by gradual dilatation. There are great differences as to the susceptibility to cold.

The first degree of *congelation* is distinguished by hyperæmia and

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beneficial effect of the bath, however, is due not to the absorption of medicinal agents but to the action on the temperature of the body, which, when higher or lower than the normal standard, is rendered uniform with that of the bath; in consequence of this uniformity the patient experiences relief. The water primarily excites the sensitive and vaso-motor nerves, producing first contraction, then dilatation of the capillaries of the skin (hyperæmia) and elevation of temperature; the respiration and pulse are accelerated, the latter afterwards becoming slower.

In regard to the absorptive power of the skin, Murray Thompson (Viertel-jahrschrift f. prakt. Heilkunde, Prag, 3, 1862) made some interesting experiments. The question as to whether medicinal agents are absorbed by the skin from warm water baths, has not yet been finally solved. So early as the year 1797 Abernethy and Falkner experimented on the subject, and concluded that cutaneous absorption from warm baths took place. Braconnot found that the urine was always increased after a bath, and its reaction neutral, although it had previously been acid or alkaline. Madden observed an increase in the weight of the body (to 5 drs.) after the bath, and Henry, absorption of iodide of potassium. Homolle found that soda was absorbed from a bath, and that the urine which had previously been acid, became alkaline. Carpenter showed that vegetable colouring matter was absorbed. Chevallier and Petit found the urine alkaline after a bath of Vichy water. Heidler defended against Lehmann the absorption and presence of salts in the blood from the use of mineral baths, Séguin, Curie, and Lehmann combat the theory of the absorption of drugs from baths; Durand-Fardel leaves the question unsettled. Thompson, from a series of careful experiments, concludes that this action of the skin has been exaggerated, that absorption takes place only in exceptional instances, and that various matters in the form of ointments may be absorbed.

* In regard to the action of cold upon the organic tissues interesting results have been obtained by the researches of Mitchell, T. A. Pouchet, Sampson, Ogston, Beck, Richardson, Weir, Crecchio, and Wertheim.

Richardson found that by exposing a part provided with terminal nervous branches to a freezing temperature (ether) 8-9° C. there was primarily a sensation of cold, then hyperæmia succeeded by a sensation of warmth. The skin subjected to the action of strong ether, was blanched, and the surrounding stasis, with serous and plastic exudation; the skin is dark, bluish-red, swollen, and itching. In most instances the action of cold produces only these appearances, but under similar conditions some persons are liable to frost-bite of the nose, hands, and feet. In such cases the general health is rarely good, the patients being either chlorotic girls or anæmic and strumous subjects. The first degree of dermatitis produced by cold and moist temperature is termed chilblain (*pernio*) an affection which is attended with severe itching: the part thus affected is infiltrated with dark bloody serum, and sometimes becomes the seat of ulceration. Under the influence of the *second* degree of cold, bullæ are formed. When parts which have been subjected to the action of intense cold are too rapidly heated, severe inflammation or even superficial gangrene of the cutaneous tissues may supervene, indolent ulcers (of variable depth) being formed, in which the healing process is slow. The *third* degree of frost-bite is the result of long continued action of intense cold; the circulation being completely arrested (*e.g.*, on the point of the nose, finger, toe, penis) the part becomes gangrenous and distinctly separated from the healthy skin. The sensibility of the part, as well as the depth of the gangrenous process may be ascertained by sounding with a needle: the escape of arterial blood also affords similar indications.

part reddened; the blanched skin remained insensible, the reddened part caused intense burning pain. The first is due to the compression of the nerves and vessels, produced by the rigid (congealed) tissues; the latter to the overloaded condition of the vessels. With the decline of the action of the ether, the blood again circulates in the vessels, and sensibility is restored. These phenomena occur at various intervals in different animals. In cold-blooded animals (*e.g.*, the frog) the effect is rapid,—in one second the limb becomes blanched. The rapidity of the action varies according to the part treated, and also the age and constitution of the individual. In young robust individuals, hyperæmia is of longer duration; reaction also occurs more rapidly. In the case of older or weaker subjects the action on the nerves is soon apparent, and the tissues become frozen; parts which are frequently in motion, as the hands, resist the action longer than those at rest.

In congealed parts Pouchet describes the blood-corpuscles as shrivelled and notched, the nuclei often free; the thawing of the part is therefore dangerous to life, as these altered blood-corpuscles enter in the circulation (?). The results obtained by this observer are comprised in the following summary:—In frozen parts the primary phenomenon is contraction of the vessels; the passage of the blood-corpuscles being thus prevented, they become corroded and the nuclei escape. If the freezing process has been limited, the part becomes gangrenous; and if only a few of these altered blood-corpuscles enter the circulation, the patient's life is not endangered. Recovery is favoured by the gradual, rather than the rapid thawing of the parts.

In his experiments on dogs and guinea pigs, Crecchio found the blood-

Treatment. In acute frost-bite of the first degree, we employ antiphlogistic measures: bandages with cold water, or Goulard's lotion, frictions with snow, etc. Chronic dermatitis or chilblain is however, much more frequent, and for its cure a host of remedies have been recommended. In many cases frictions with ice or snow will effect the cure of chilblains in a short time; in acute cases, however, according to our experience, a fortnight at least is required for the treatment; after which the parts must be protected from the action of the cold by strips of adhesive plaster; in cases in which there is extensive œdema, this method may be adopted; the inunction of oil may also be useful. The various vegetable and mineral acids (such as citric, pyroligneous, and nitric acids) are enumerated amongst the remedies, also chloride of lime, solution of nitrate of silver, tincture of iodine, collodion, camphor, etc.; and ammoniacal substances, as joiner's glue and guano.* In chilblains of the second degree, the parts may be touched with nitrate of silver when the bullæ have been evacuated. In frost-bite of the third degree, the eschar should be removed as soon as possible.

corpuscles degenerated (getrübt). In the frog the vessels were contracted, and the circulation retarded, the passage of blood-corpuscles being at length prevented. There is only slight contraction of the larger vessels; their course becomes tortuous, and they appear dark in colour and loaded with blood. Whenever the action of cold ceases, the circulation in the minute capillaries is resumed; from half an hour to two hours is sufficient to allow the escape of the nuclei. As the result of cold there is primary irritation and subsequent paralysis of the vaso-motor nerves, distension of the vessels being the final change. As shown by the electric current, innervation is suspended. Crecchio denies the occurrence of the blood-corpuscles (described by Pouchet), which he could not discover in the heart, liver and lungs, except when the freezing process had been long continued. Crecchio found that when the limbs of frogs were frozen and amputated, the animals survived, whilst those in which the frozen limbs had not been amputated, died in from one to eight days: his explanation is that in the first case the absorption of gangrenous tissue was prevented. Similar results were obtained by experiments on guinea pigs. The fatal effects produced by subjecting frozen parts suddenly to a high temperature, are due to the increased supply of blood thus directed to the internal organs,—as the heart, liver, lungs, and brain, which are already in a state of congestion. In fatal cases of this kind, disturbance of innervation is indicated by the disagreeable itching, the feeling of drowsiness, insensibility, or great pain—symptoms which precede the appearance of gangrene. During the Russian campaign many of the French soldiers died with symptoms of catalepsy and epilepsy, and many of the survivors suffered from hemiplegia. When recovery takes place the speech and taste remain impaired for some time.

Wertheim observed considerable decrease of the temperature of the subcutaneous cellular tissue and augmented excretion of carbonic acid.

* Billroth recommends zinc ointment as an application to chilblains.

CLASS III.

HÆMORRHAGIC AFFECTIONS.

There are two modes in which blood may be effused into the tissue of the cutis—from the rupture of the vessels (extravasation), or from the escape of blood-corpuscles without rupture (diapedesis). The latter process was first accurately demonstrated by *S. Stricker,* who observed under the microscope in the aponeurosis of the living frog, the gradual passage of the red blood-corpuscles through the wall of the vessel, appearing as if connected to the latter by a thin neck, and finally, quite exterior to the vascular wall. *Prussak* observed similar phenomena in frogs and rabbits, into the skin of which he had injected a solution of chloride of sodium, thus inducing an artificial scorbutus.

Hæmorrhage occurs spontaneously as the result of morbid conditions of the blood itself or of the blood-vessels (typhus, scorbutus, variola, morbilli, and scarlatina hæmorrhagica), or in consequence of wounds which directly rupture the vascular walls.

The hæmorrhagic affections appear as—1. *petechiæ, i.e.,* minute punctated extravasations, 2. *vibices* or streaks, 3. *ecchymoses, i.e.,* large red spots, and 4. *ecchymomata,* or contusions. In order to determine whether reddening of the skin is due to inflammation or to hæmorrhage, the pressure of the finger is sufficient:—the redness caused by hyperæmia or stasis fades, but returns when the pressure ceases, whilst that due to hæmorrhage remains unchanged.

It is only in exceptional cases that cutaneous hæmorrhage is caused by specific morbid conditions, as scorbutus; usually it is associated with the inflammatory process in various forms: thus hæmorrhage may occur in connection with herpes vesicles, pemphigus blebs, lichen papules or ecthyma pustules, the serous or purulent exudation being mingled with blood. The occurrence of such hæmorrhage is favoured by the so-called scorbutic condition of the blood, by struma, and especially by mal-nutrition of the system; also by congestion of the lower limbs from long continued walking or standing; and lastly, by direct injury, which we have already described as the cause of the disease in ecthyma and impetigo. The disturbances of circulation, which induce stasis of the venous system, readily occasion hæmorrhage: as is well-known, these frequently depend upon insufficiency of the valves of the heart, as well as permanent *foramen ovale* or *ductus arteriosus*. The bluish coloration of the skin (*morbus cœruleus* of the ancients) indicates serous stasis, and in such cases inflammatory exudation may readily become hæmorrhagic. Transitory hæmorrhage in the skin may also take place during pregnancy, parturition, or as the result of hooping cough.

The forms of cutaneous hæmorrhage vary in the different affections: thus in *morbus maculosus* (*Werlhofii*) hæmorrhage appears as maculæ; in *lichen lividus, peliosis rheumatica,* and *morbilli* as papules; in *erythema nodosum* as wheals; in *contusion*[*] as blebs; in *purpura variolosa* as vesicles. The changes in colour which take place are due to the transformations of the hæmatosine of the extravasated blood, which either remains in the blood-corpuscles as minute aggregations, producing reddish-brown maculæ on the skin; or hæmatoidin crystals are formed, which produce varied pigmentation.[†]

Purpura simplex. This affection may occur in well-nourished persons from the use of certain drugs, as the balsam of copaiva: the eruption consists of hæmorrhagic spots (varying in size from that of a pea to that of a shilling, or larger) which usually disappear in a few days, and may be accompanied by febrile symptoms.

Purpura papulosa (*Lichen lividus Willan.*) most frequently occurs in strumous, cachectic subjects, especially those suffering from *lichen scrofulosorum:* the eruption appears as reddish papules, mostly on the lower extremities, and chiefly the dorsal surfaces of the feet.

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[*] Hebra states that the small blebs produced by direct violence alone contain pure blood, and that this coagulates very quickly, so that the solid elevations thus formed can no longer be called anything but wheals or tubercles. As the skin of children is extremely delicate, effusion of blood into the cutis sometimes takes place in consequence of weakening diseases, as for instance, long continued hooping cough: and in such cases the epidermis is elevated in the form of hæmorrhagic blebs. I have in my possession a drawing (by Dr. Heitzmann) showing the skin of a child, æt. 6 months, covered with numerous hæmorrhagic blebs.

[†] The varieties of purpura (especially the scorbutic) were formerly attributed to a diminution of the fibrin in the blood; Becquerel, has shown that in such cases the blood is less coagulable than in the normal condition. As the blood in purpura is very rich in alkaline salts, Becquerel believes that the disease may be induced by the administration of large doses of alkalics. The urine also contains an excess of P O 5, N H O.

Purpura traumatica. This term comprises the varieties of extravasation caused by mechanical injuries, as contusions and bruises: these occur mostly on prominent parts of the body where there is a substratum of bone. The effusion of blood is usually circumscribed, corresponding to the cause by which it was produced: extensive extravasations of this kind are termed *ecchymomata;* from the changes of colour which the effused blood assumes, the skin passes through various shades of dark blue or violet, brownish red, later, greenish and yellowish. In exceptional cases suppuration occurs and purulent admixture with the blood, the so-called hæmorrhagic abscess.

Purpura Rheumatica (*Peliosis Rheumatica*). The symptoms commence with pain in the joints (most often the knee-joint), loss of appetite, derangement of the stomach, and general prostration; in two or three days there appear on the lower extremities, and later, on other parts of the body, dark or livid red spots and papules. These become darker, then paler, and at last assume various green or yellowish tints, and disappear. Around the knee-joints there is œdematous swelling, and as this occurs simultaneously with pain in the joints, the affection might at first be confounded with articular rheumatism. The urine is sometimes albuminous. The duration of the disease varies between a fortnight and several months; in many cases a fresh outbreak takes place within a few hours after the patient has begun to go about. It is most frequent in young people; and the affection is periodic, *i.e.*, in those in whom it has once appeared it is liable to recur in spring and autumn.

Simultaneously with this form of purpura, erythema (*papulatum, gyratum* and *urticans*) and herpes occur, so that the affection would appear to be dependent upon similar causes, which are still unexplained.

Purpura hæmorrhagica or *morbus maculosus Werlhofii.* This disease shows itself as an eruption of punctated bright or dark red spots on the entire cutaneous surface, and especially on the lower extremities. At the same time similar ecchymoses appear on the mucous membrane of the mouth and nose; there is also epistaxis and bleeding from the gums, as well as from the mucous membranes of internal organs (intestine, kidneys, and lungs). The affection appears to be induced by the same causes as scurvy, and differs from it only in the form of the maculæ.

The *prognosis* is unfavourable; the fatal result is in most cases due to internal hæmorrhage.

Scorbutic ulcers occur chiefly on the legs, also on the gums and palate, and on other parts of the body; they originate in subcutaneous effusion of blood, induced by the scorbutic "dyscrasia." These ulcers, characterised by bluish flabby granulations, are surrounded by an area of dark or livid skin; the discharge is serous and purulent, with admixture of blood, the borders are soft, œdematous, and infiltrated with blood. The ulcer extends rapidly to the surrounding parts, and may lead to caries of the bones. The healing process extends uniformly from the edges, and the cicatrix is thin, shining, and of bluish colour.

Blood-sweat is a rare condition, due to extravasation of blood from the capillaries into the sweat-glands. This hæmorrhage is most likely to occur on parts at which the epidermis is extremely thin, as at the root and sides of the nail, on the borders of the nostrils, the neck, arm, and inner surface of the thigh. The blood exudes in drops, and this may continue some hours, and be repeated after various intervals. The predisposition to this affection may last for years, and even for life. During the periods of childhood and puberty the liability to this condition is greatest. As exciting causes, may be mentioned the action of powerful heat, muscular exertion, and vicarious menstruation.

Wagner (Arch. für Heilkunde, 10 J., 4 Heft) found the following changes in the petechiæ of scurvy: the hæmorrhage was irregularly sinuous (ästig) and situate in the loose tissue between the dense connective tissue bundles of the superficial layer of the corium, and mostly separated by 1-30‴ from the rete Malpighii, rarely encroaching directly on that structure. The effused fluid consists only at parts of unaltered blood-corpuscles, being chiefly a molecular mass with scanty fat granules, and minute, glistening, red pigment nuclei. The epithelia of the cutis, glands, and hair-follicles were normal at most parts. On parts at which the hæmorrhage in the corium was most extensive, the skin was uniformly reddened; blood-corpuscles, however, were not observed around or between the petechiæ. Epithelial cells containing blood-corpuscles, are also occasionally met with.

Treatment. In purpura rheumatica the patient is to be kept at rest in the horizontal position, and bandages soaked in water mixed with acid, are to be applied. In the other forms of purpura the treatment consists in removing the causes: Internally, *secale cornutum* 8-10 grs. pro-dic (*Henoch, Bauer*); and sesquichloride of iron.

CLASS IV.

HYPERTROPHIC AFFECTIONS.

Hypertrophy is an increase of volume in an organ or part of an organ without impairment of its functions. This condition is due to increase of pre-formed elements—*true hypertrophy*—or the addition of new elements—*false hypertrophy* (Rokitansky). Hypertrophy arises from augmented supply of nutritive material, as in congestion, or increased vascular activity, or from deficient re-absorption as the result of the inflammatory process, or from various direct irritants, especially those which give rise to chronic inflammation. In many families there exists a tendency to hypertrophy. Hypertrophic conditions of the skin are of most interest to us; we placed them under this designation, although a few of them may also be classed among the new growths, as they afford neither clinical nor microscopical characters to refer them to one or the other class.

A. Hypertrophy Chiefly of Epidermal Elements.

1. LICHEN PILARIS.

As we have already seen, the affection which was thus termed by Willan is incorrectly placed amongst the varieties of lichen: for the morbid process consists merely in an accumulation of epidermic masses which form papules at the apertures of the hair-follicles. These papules (of the size of a pin's head) resemble, or are somewhat darker in colour than the surrounding skin; the follicles contain a coiled hair in their interior. Simon, finding that the occlusion of the hair-follicle is caused by sebaceous masses, describes the affection as *acne vulgaris.* In some cases, doubtless both conditions—accumulation of sebum and epidermis—are concerned in the formation of the papules.

The seat of the eruption is mostly the extensor surfaces of the thighs; other parts, however, and even the entire body (with the exception of the face) may be attacked. The affection is most likely to arise in persons who neglect washing the skin, as the epidermic masses (which in the normal condition are thrown off spontaneously or from the friction of the clothes) accumulate around the apertures of the follicles.

Lichen pilaris may be confounded with—1. *Lichen exudativus ruber.* 2. *Lichen scrofulosorum.* 3. *Papular syphilis.*

The most important point in the diagnosis is the localisation of L. pilaris on the extensor surfaces of the thighs; mistakes therefore arise only when it is distributed over the entire cutaneous surface. The following distinctions are to be borne in mind:—in protracted cases of *L. exudativus ruber* and *scrofulosorum* the papules occur in groups, whilst in *L. pilaris* they are distinct, and unaccompanied by the excessive formation of epidermis as well as atrophic and deep seated changes in the skin, which are present in the other two affections. The eruption of L. pilaris is distinguished from those of syphilis by the dark-red base peculiar to syphilitic papules.

The *treatment* consists in friction of the skin with soap, and in the employment of warm baths.

2. TYLOSIS (*Tyloma, Schwiele).*

This term is applied to an hypertrophy of the epidermis forming yellow or grayish brown masses which are firmly adherent to the skin, and insensible to the touch. This condition is due to increased formation of epidermic cells: thus the cuticle acquires a horny aspect whilst the cutis remains normal. It occurs chiefly on parts at which the skin is closely approximated to the bones, and rarely on muscular parts of the body. These callosities are produced by pressure and friction,—acting at intervals; when the pressure is continuous, atrophy of the skin is induced. Tylosis is most frequently met with working in men, its site being indicative of the occupation of the individual; as for instance, in shoemakers on the right hand and on the left thigh, from the pressure of the leather strap on the hand and from the blows of the hammer on the shoe which is supported on the thigh: callosities are liable to be formed in those who work much with the hands, as in violin and zither players. The growth of callosities is usually preceded by repeated inflammation and even formation of bullæ. During puberty callosities are sometimes produced spontaneously on the palm of the hand and sole of the foot, but usually disappear between the ages of twenty and thirty. As the result of irritation produced by excessive muscular action on parts of the skin covered with callosities, suppuration frequently takes place, and the pus collecting under the thickened skin gives rise to severe pain. In such cases we should not await the spontaneous opening of the abscess; as soon as the presence of pus is ascertained, it is to be allowed to escape by opening with the knife. On the healing of the abscess the callosity usually disappears.

Treatment. In most cases callosities give rise to no inconvenience, and serve indeed to protect the subjacent papillary layer in people whose occupation requires frequent use of the hands. It is only when persons thus affected change their occupation and in cases in which inflammatory symptoms appear that treatment becomes necessary. The epidermic masses may be removed by scissors or knife, and pressure by adhesive plaster then applied, or the parts may be painted with caustic potash or other caustic remedies. When the pressure is removed the callosity gradually disappears.

3. CLAVUS *(Leichdorn).*

This is a callosity with a plug-shaped central mass or nucleus, which is seated in a depression of the cutis. The subjacent corium is thin, and the papillæ atrophied: sometimes, however, there is hypertrophy of the papillæ. The extremity of the horny growth, which extends into the corium, frequently exhibits clefts or fissures, which are occupied by the rete Malpighii. The sweat glands of the cutis beneath the clavus are also atrophied.

The form of clavus which occurs on the inner surface of the toes is softer but similar in structure to those on other parts. The mucous sacks (Schleimbeutel) which occur in the cutis beneath these callosities are not due to the morbid growth, but exist on the inner surface of the toes in the normal condition. As is well-known, corns are most frequent on the toes, the dorsal, and especially plantar surfaces of the foot; on the latter situation they frequently exist in such numbers that walking is attended with most severe pain. These growths are produced by the pressure and friction of the covering of the feet.

Treatment. Amongst the many remedial measures which have been recommended are the various softening plasters (as *Empl. hydrarg.* or *Empl. diachyl.);* the shoes should be made to fit properly and after the corns have been extracted, wool rings may be applied; also the application of a solution of nitrate of silver, nitric and chromic acids. C. Heitzmann recommends the following method:—the skin around the corn, having been previously softened by bathing the foot in warm water, is held with two fingers of the left hand, the corn is raised and then removed by one cut with sharp scissors. The round pit thus left acts as a protective against pressure, and the operation is repeated after four or five days, when the depression has been re-occupied by the growing corn. By repeating the operation several times the corn is permanently removed without pain or hæmorrhage.

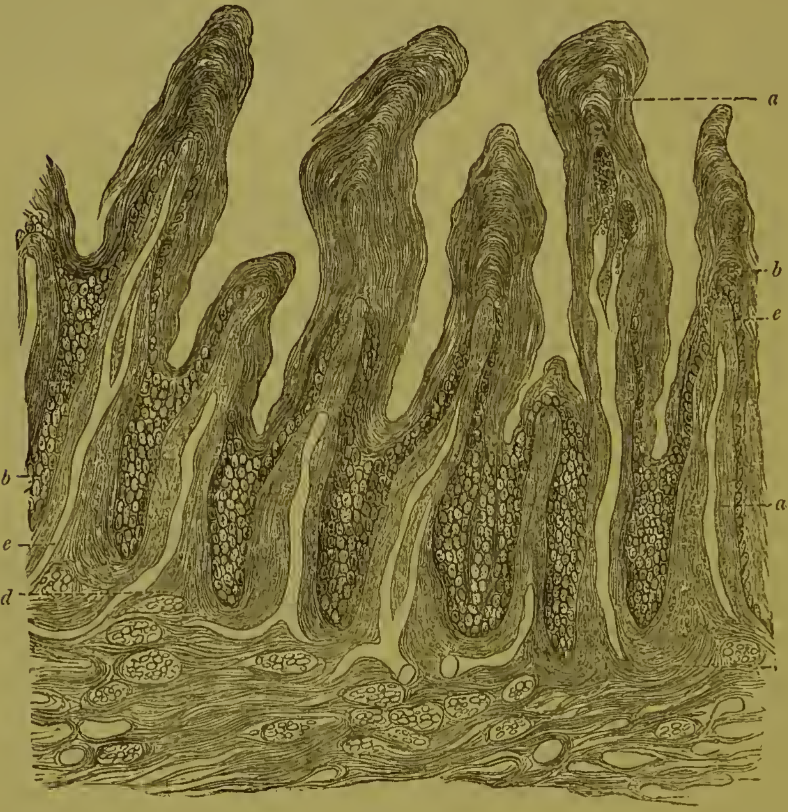
4. ICHTHYOSIS *(Fischschuppenausschlag).*

This term designates a disease which is characterized by the accumulation of epidermic masses, hypertrophy of the papillary layer, thickening of the entire corium, and morbid changes in the cutaneous glands. The simplest form is *ichthyosis sebacea,* which is more correctly placed under seborrhœa (see page 55) as in this affection solid sebaceous masses are formed which separate along the furrows of the skin.

The accumulated epidermic masses are either thin, pearly, closely adherent to the centre of the patch, and attached to the polygonal tracts bordered by the ridges formed of the hypertrophic papillary layer, *pearly ichthyosis (ichthyosis nacrée, Alibert)*; or the scales are superimposed in dense layers, of a dark colour, and embedded in the polygonal tracts, *ichthyosis serpentina* or *cyprina* (*ichthyosis simplex*); or the accumulated masses form projections which contain the ramifications of the elongated and narrow papillæ, *ichthyosis histrix* or *histricismus, ichthyosis cornea* (*Stachelschweinmenschen*). The colour of these masses depends upon their quantity and the duration of the disease; at first the scales are white or greenish, later, brown, and lastly, black. The affection usually commences on the extensor surfaces of the extremities, from which it extends to all parts of the skin, with the exception of the flexor surfaces of the joints, the genitals, and the face. Ichthyosis is also regarded as hereditary. The form of the disease attacking infants, however, is distinct from that of adults, as the papillary layer is not hypertrophied, and the formation of the epidermic lamellæ is different; it is termed *ichthyosis sebacea neonatorum* (*Hebra*), *scutulatio seu incrustatio* (*Steinhausen*).

Children thus affected die within a few days after birth. Lebert describes this form as *keratosis diffusa epidermica intrauterina*. The disease usually appears between the ages of two and three, and becomes progressively developed, especially in people who neglect washing the skin; the epidermic masses accumulate, the cutis becomes hypertrophied, fissured, and painful. In exceptional cases, ichthyosis remains limited to small areas of the skin for years, and masses of epidermic cells are observed to accumulate along the course of particular cutaneous nerves.

Fig. 25.



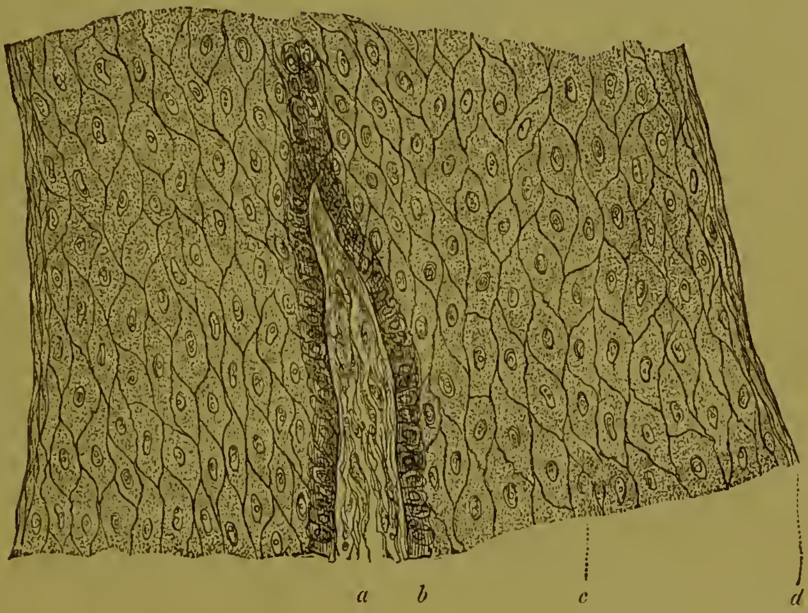
Section of ichthyotic skin (after M. Kohn. Archiv für Derm. u. Syphil). *a.* Accumulated epidermic layers. *b.* Rete Malpighii. *c.* Distended blood-vessel. *d.* Cells of cutis. *e.* Elongated papilla.

Etiology. The causes of ichthyosis are still obscure; it is only certain that the affection may be transmitted from parents to children; some of the children in a family may suffer from the disease, whilst others are exempted.

Some authors attribute the disease to quantitative and qualitative changes of the secretion of the cutaneous glands; others believe that the affection arises from a mere hypertrophy of the epidermis, induced by augmented or impeded sebaceous secretion which dries up between the epidermic lamellæ (Buchner); it is also stated, that ichthyosis depends upon a qualitative change of the plasma excreted by the cutaneous capillaries, as the result of which, fatty degeneration of the epidermic cells occurs, accompanied with a deviation in the secretion of the cutaneous glands (Schabel). The fatty epidermic cells act as a uniting medium between the normal and still degenerating cells, and frequently in conjunction with the accumulated secretions of the cutaneous glands, form the epidermic layers of ichthyosis.

Anatomy. The papillæ are enlarged, richly infiltrated with cells, the vessels considerably dilated, the cutis thickened, and its connective tissue condensed. On vertical section of the skin affected with ichthyosis, the epidermic layer is seen to be enormously extended, constructed of heaps of scales; the Malpighian layer between the papillæ greatly hypertrophied. In severe cases, section of epidermis shows variously tinted lamellæ (yellowish-brown to dark-brown or black); in one case I observed the cellular layer (rete Malpighii), adjacent to the papilla, richly interspersed with dark pigmentary nuclei. In the parts of the epidermis, extending into the interstices of the enlarged papillæ, the "spinous

Fig. 26.



Ichthyosis. *a.* Papilla. *b.* Layer of pigment. *c.* Epidermis. *d.* Flat epidermic lamellæ.

cells" are greatly developed.* In slight cases the hair-follicles remain, but appear somewhat elongated, and contain the hairs; the apertures of the hair-follicles are frequently occluded. The sebaceous glands cannot be recognised.†

Prognosis. In milder cases ichthyosis may last for years without causing the patient any other inconvenience than slight itching; in the more severe forms (*ichthyosis histrix* and *cornea*) the disease is painful and incurable, sooner or later, inducing emaciation, and usually associated with tuberculosis.

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* Büchner (Arch. f. phys. Heilkunde, 1854) describes a case of ichthyosis: the microscopic investigation of very fine transverse sections showed a peculiar arrangement of lamellæ. This specimen showed numerous roundish spaces (from 0.02-0.08 Mm. in breadth) which were surrounded by innumerable lamellæ, disposed in concentric layers. Besides these were lamellæ extending in all directions, which resembled those of bone substance, surrounding the Haversian canals. Most of these loculi were occupied by a pale-grey granular substance; some of them contained large transparent molecules (measuring 0.03 Mm.); and in a few of them the section of a hair was observed, which did not entirely occupy the space, but was surrounded by a deposit of fat. In many parts air cavities were found to exist extensively between the lamellæ.

The vertical sections showed different changes; here were seen numerous cylindrical (0.036 Mm. in breadth) and pyramidal structures, resembling the papillæ of the cutis, all of which were composed of epidermic lamellæ. In the cylindrical structures the lamellæ were arranged longitudinally, in the pyramids, obliquely. In many of these lamellæ fat was an essential constituent; all possible degrees of fatty metamorphosis were observed.

† Schlossberger has investigated the scaly masses chemically, and has obtained the following interesting results:—in the sediment, obtained by the action of alcohol on the scaly masses (which appeared as a reddish-yellow syrup with an acid reaction, and resembling in odour the ozonazon of the muscles), he found crystals, a great quantity of fat granules and cholestearine plates. After washing this syrup with alcohol the greater part of the fat and cholestearine remained; the filtrated acid solution, however, by gradual evaporation separated crystals, which had all the characteristics of hippuric acid. Besides this hippuric acid (of which Schl. was unable to make an elementary analysis) brownish and lustrous plates of cholestearine as well as the characteristic stearine crystals were deposited by further evaporation of this alcoholic solution. By the action of ether on the mass of scales (which had been treated with alcohol) a quantity of solid and fluid fat and stearine was obtained. The mass thus treated with alcohol and ether had retained its original scaly form, and had lost only its fatty character and aspect; it did not dissolve even after being digested for four weeks in alkaline lye, or acetic acid: water dissolved out some organic matter and salts; not a trace of sulphate salts, however, existed in the watery extract. The mass did not show any decided calcareous reaction on being boiled in the Papinianic digestor. The ash of the scales somewhat exceeded 1 per cent., and was of a distinctly yellow tint, was insoluble, and did not effervesce when treated with acids; its watery solution had a neutral reaction, and contained chlorides of soda and potash, as well as traces of lime; its acid solution contained phosphate of iron and phosphates of lime and magnesia; manganese (which is said to occur in the hair) was not observed by Schlossberger.

Treatment. In severe cases, we prescribe arsenic internally, as this drug has been found by experience to be useful in disease of the epidermic structures. Local treatment, however, is of greater importance, and consists in macerating the skin by the repeated employment of luke-warm baths; in slighter cases, inunction with fat, cod-liver oil, spermaceti, and olive oil; and in obstinate cases, soft-soap, in the form of the well-known "soft-soap cure," the patient being afterwards enveloped in blankets. Inunction with the following ointment also tends to diminish the tension: *Pulv. alum. plumos. Sperm. ceti a.a.* ʒij. *Ceræ alb., Ol. oliv.,* ℥j. *Ol. neroli. gtt.* x. Baths containing sulphur or common salt afford temporary relief. It will be seen from the foregoing remarks that all these means afford only temporary relief without permanently curing the disease. The occurrence of the acute exanthemata (as variola, scarlatina, and morbilli) seems to exert a beneficial action in cases of ichthyosis.

5. VERRUCA (*Warze, Warts*).

This term comprises the following varieties:—

Verruca vulgaris, the hard or common wart, is a small, hard, crescentic or conical excrescence which occurs on the hands, feet, face, and ears, either isolated or in groups. It is formed of enlarged papillæ, which are covered with a dense, epidermic layer; in some cases the epidermis extends deeply between the papillæ, the surface thus acquiring a rugose aspect as if the wart were composed of several separate parts (*acrothymion*). In such parts the vessels are usually of a considerable size.

Verruca filiformis (*acrochordon*) is a small, hard, and thread-like excrescence, which occurs especially on the upper eye-lids and neck; the growth varies in length from two to four lines and is not much thicker than a hog's bristle.

Verruca plana is a flat and distinctly circumscribed structure, which but slightly projects above the surface of the skin; it occurs isolated chiefly on the hands of adults, as also in great numbers often on the face and hands of children.

Besides these, various other terms are used, according to the form and structure of the excrescence; as *porrum, myrmecia, ficus, verruca sarcomatosa, lipomatosa, etc.;* these, however, are more correctly placed under the group of tumors, being termed *sarcoma,* *lipoma, etc.* Nævi are similar structures, of a dark colour and larger size (see nævus).

Treatment. In the case of isolated warts, extirpation by the scissors is the best method of removal; the base of the excrescence is to be compressed by two fingers of the left hand, in order to prevent pain and hæmorrhage, and the wound is then touched with nitrate of silver. A slight cicatrix, however, always remains. If the warts be numerous the operation must be frequently repeated, or they may be painted with sulphuric, chromic, or acetic acid; the latter is applied either alone or in conjunction with *lac. sulf.* in the form of a paste. In *verruca plana* the concentrated carbolic acid is especially useful.

6. CORNU CUTANEUM (*Hauthorn*).

This growth consists of a conical, curved, or spiral epidermic mass, of a brownish colour, sometimes attaining the length of several inches, and presenting elevated ridges and transverse shallow groves. It is sometimes only a flat projection (of yellow, grey, brown, or black colour), produced by a circumscribed accumulation of epidermis.

Fig. 27.

Cornu cutaneum. (From the Pathological Museum of Vienna.)

On microscopic examination, the structure of the cornu cutaneum is seen to resemble that of the epidermis and nails. *Simon* found in one specimen a cortical and medullary substance, similar to that in the horns of the ruminants. More minute examination shows a tissue traversed by numerous channels, which in dry specimens appear as crescentic fissures. The horny mass presents no calcification; in a somewhat thicker transverse section from the dense central portion (when slightly magnified) these small fissures are recognised as cylindrical tubes, *i.e.*, as *blood-vessels*, which partly retain the reddish colour of their contents. Each vessel is surrounded by a transparent, amber-coloured and circular area, in which is observed the nuclear substance forming the superstructure; the compact portion of the horn-substance cannot be resolved into its original elements. The vascular and papillary condition of the tumor is best demonstrated by making vertical sections from the edges; the vessels extend some distance into the axis of the papillæ; the limits of the transparent cylindrical portion are distinctly marked, and appear to correspond to the basement membrane. The central part of the horn is more compact and less vascular than the external portion. *(A. M. Edwards).*

From the character of this cutaneous horn we regard it as an enormously enlarged wart, the entire horny structure being composed of closely aggregated columnar elements. In two cases which have come under our observation the cortical and medullary layer were indistinguishable, nor were the papillæ seen to extend into the base of the horn; there was merely a shallow depression. The horny growth arises from several papillæ. We have never seen the growth of a true horn from sebaceous glands, as described by some authors.

This growth of horn takes place mostly in women on the scalp, the forehead, and the temples, more rarely on the face and extremities, and still more rarely on the trunk; the growth is slow and is unattended with pain.

Treatment. The horn with its matrix is to be excised from its base and cauterized with nitrate of silver.

7. HYPERTROPHY OF THE HAIR (*Polytrichia, Trichaux*).

The growth of hair takes place either on parts, otherwise free (*hirsuties adnata*), or on pigment moles, or on parts usually covered throughout life only by lanugo (*hypertrichosis universalis*), as for instance, the growth of beards in women and children. The hair may also present unusual length, calibre, and pigmentation; for instance, the hair of the genitals and axilla attain the length of a yard, or that of the eye-brows, back, and chest may be similarly developed.

This abnormal growth of hair is mostly congenital; it rarely takes place at a later period as the result of violent nervous disturbance and severe illness (*Beigel. Virchow's Arch.* 44).

In a few tribes the body is entirely covered with hair, as the Ainos of Yesso, in the North of Japan; the hair of the head is luxuriant, bushy, and matted, the beard strong and profuse, the greater part of the face and other parts of the body covered with dark hair (Beigel).

The extirpation of the hair can only be effected by destroying the papilla; cauterization with galvano caustic, etc., may therefore be applied, but as this treatment leaves cicatrices, it is preferable to extract the hairs by the forceps.

8. HYPERTROPHY OF THE NAILS.

The nail is either lengthened and curved anteriorly, or thickened; the former condition occurs when the nails are left uncut, or as the result of disease. The thickening is due either to unusual hardness of the nails, several layers being superimposed, or to the deposit of a brittle substance beneath the nail. The nails thus affected become rough, uneven, deprived of their lustre, separated from the matrix, or broken into longitudinal and transverse splinters. The increased size of the nail is due either to inflammation of its bed, or to syphilis, or psoriasis, or to the existence of fungi in the nail substance (onychomykosis). In hypertrophy of the nails (onychogryphosis), according to Virchow,* there are either superimposed layers of nail substance with circumscribed spaces (Markräume) between the laminæ, or the entire nail assumes a cubical or conical form: the nail is compressed and its bed shortened. Lastly, there occur claw-like nails, in which the anterior border is broken off, or spirally curved.

9. POINTED CONDYLOMA (*Spitze Condylome, Condylomata acuminata, elevata, Feigwarzen*).

These are pointed or roundish wart-like growths, which occur separately or in groups, usually presenting a dry surface, or rarely covered with thin crusts; they appear chiefly on the genitals (prepuce, glans, labia majora, and minora), anus, mucous membranes of the vagina and mouth, the axilla, and toes. These growths are seated on a broad or narrow base, and sometimes present a rugose (mulberry-like) or flattened and compressed apex (from the pressure of two opposed surfaces); on parts, *e. g.* pudenda, where the condylomata are dry, the surface is white (*condylomata alba*); on certain parts, *e. g.* prepuce and labia minora, this growth is favoured by the rapid decomposition of fluid secretions, by profuse sebaceous secretion, blennorrhœa, or by the purulent discharge of soft chancres. Condylomata are transmitted by contact, and as Lindwurm, Kautz, and others have shown, may be produced by inoculation. These condylomata take their origin from an enlargement of the papillæ, the vessels of which are greatly distended, or from cell-growth, or from the fusiform migrating cells (?). The rete Malpighii is thickened as well by the increase of these cells, which extend from the papillæ into it (*Biesiadecki*), as by their proliferation; the epidermis is considerably thickened, and often fissured.*

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* Würzburg. Verhandlungen. Band 6.

Treatment. The simplest treatment is the removal of the growth by scissors or knife, and subsequent cauterization of the base with nitrate of silver; large sessile condylomata are removed by the galvano-caustic. On parts at which the surrounding healthy skin can be protected, we may apply Vienna paste, or a paste consisting of sulphuric acid and carbon; good results have also been obtained from a mixture of *Sulph. ferr; Alum.* and *pulvis Sabinæ,* also *Ferr. sesquichlorat.* and *acid carbolicum.*

B. Hypertrophy Chiefly of Connective Tissue Elements.

1. ELEPHANTIASIS ARABUM (*Pachydermia, hypersarkosis Roosbeen, Barbadosbein, Morbus Herculeus*).

This term is applied to a disease which consists in an hypertrophy of the skin and subcutaneous cellular tissue, whereby the bulk of the affected part is considerably increased. The special seats of this affection are the leg, foot, scrotum, penis, labia majora and minora, and clitoris; sometimes also the upper extremities, the female breast, and the external ear.

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* *Framboësia.* This term (from resemblance to strawberries) is applied to granulations appearing extensively and in groups, the surface of which is covered by epidermis, the interspaces being occupied by purulent or sebaceous matter; they are termed *mykosis* by Alibert, and *multiple papillary growths* by Köbner. Hebra applies the term *framboësia* to rapidly growing granulations (proud flesh), which appear on syphilitic, strumous, and lupoid ulcers. In microscopic structure, these growths in most cases resemble those of syphilis and lupus. According to Köbner, the growth proceeds from the areolar tissue of the corium, the papillæ being elongated and thickened; there are nucleated cells and dilated (newly-formed) blood-vessels. These growths occur mostly on the extremities (toes and hands), anus, nipple, and sternum. Framboësia also appears in the form of large tumours (*Wülste*) on a broad base, chiefly located on the hairy scalp and neck, the surface being marked with wart-like eminences, tufts of hair growing on the central portion. This form may be idiopathic or traumatic in its origin. Virchow (46 B. 1 Heft) observed in a case of framboësia, an extremely vascular granulation-tissue, closely connected with the adjoining areolar tissue, displaying the changes from simple proliferation of nuclei in the connective-tissue corpuscles to the new cell-growth. In structure, therefore, they resemble granulation tissue.

In severe cases, the scrotum extends to the feet in the form of a bag, which may exceed a hundred pounds in weight, the testicles usually remaining unchanged; the penis is shrivelled, and completely covered by the thickened and elongated prepuce. According to Rayer, elephantiasis of the genitals is primarily a hypertrophy of the subcutaneous cellular tissue, with subsequent increase of the fibrous element of the skin. The disease commences with the symptoms of erysipelas and with œdematous swelling of the lymphatic glands and adjacent parts. On cutting into the affected part, a clear yellowish fluid exudes, which (if squeezed out) soon coagulates, separating masses of fibrin (lymph). As the lymphatic vessels become impervious, an accumulation of lymph takes place; the disease, therefore, is rather lymphatic than ordinary œdema. The connective tissue cells are enlarged, and newly-formed cells accumulate in great numbers. In consequence of recurrence of erysipelas, the tissues become denser and thicker; so that ultimately the entire cutis, subcutaneous cellular tissue, fasciæ, intermuscular connective tissue, and even periosteum are implicated. If the papillary layer be chiefly involved, the disease is termed *Elephantiasis papillaris seu verrucosa;* if the deeper layers be affected, the surface remaining smooth and normal, *E. lævis seu glabra*; if several points be elevated in the form of nodules (of the size of a pea), *E. tuberosa s. nodosa;* if there be deposits of pigment in the rete Malpighii or epidermis, whereby the affected part receives a dark tint, *E. fusca et nigra;* if the newly-formed masses of connective tissue are dense, *E. dura;* if soft and thin, *E. mollis;* if the nodules or other infiltrations become pustular, *E. ulcerosa;* sometimes, however, considerable hypertrophy or new formation of blood-vessels takes place, a morbid condition which we term *E. teleangiektodes.* The glandular structures of the skin exhibit no essential change, but are more deeply situated; the hair-follicle, for instance, is at a depth of half an inch. The layers of the skin are blended together (the limits of the cutis and subcutaneous cellular tissue indistinct), a hard mass being thus formed, in which the sections of numerous dilated vessels are observed. The dropsical cellular tissue around the testicles is changed into a pulpy mass.

The legs frequently attain an enormous size, the skin and the thickened subcutaneous cellular tissue forming a mass which is saturated with serum; and this infiltration extends throughout the muscles to the periostum and bones, which undergo atrophy. In some cases, anchylosis of the joints takes place. The commencement of the disease may be observed chiefly in the leg as an idiopathic erysipelatous inflammation, or as the result of eczema, phlebitis, or lymphangiotis. Thus, after the disease has lasted some time, the hypertrophied papillæ are seen (with the naked eye) covering the surface like the hairs of a brush; large ulcers are frequently formed, which present swollen and thickened borders and hard base, with scanty granulations and slight purulent discharge. The epidermis is usually hypertrophied in the form of horny plates, as in ichthyosis.

Elephantiasis is a pandemic disease; in certain districts, however, it is endemic, especially in the Island of Barbadoes, on the Andes, in Brazil, and in the East Indies; in Japan, one in every ten persons is said to suffer from it; in Mauritius and in Algeria, it is less frequent. In Egypt, the affection has been endemic since remote antiquity, especially in Lower Egypt; also in the district of Sierra Leone, on the pepper coast of Morocco and Morea. It occurs more frequently in dry or marshy districts than in those which are well wooded. It appears throughout Europe, especially on the coasts of the Baltic and Mediterranean, but chiefly in Ireland and France. The disease is as frequent in males as in females; it rarely appears before the age of puberty, especially the variety attacking the genitals. The affection is probably hereditary. Its causes are still obscure: in districts where it is endemic, it is observed that during the rainy season the inflammatory attacks occur simultaneously with epidemics of intermittent fever; as secondary causes the following have been mentioned:—cold, suddenly changing winds, evaporation of stagnant water, and the effects of bad food. The sporadic cases which occur in our own country are frequently sequelæ of chronic eczema, erysipelas, phlebitis, and lymphangiotis, varicose veins, or disease of the bones (chronic periostitis, caries, necrosis).

Prognosis. Elephantiasis is a skin disease from which persons may suffer for years without essential impairment of the general health; in time, however, the affected parts give rise to inconvenience from their bulk and weight; on the legs incurable ulcers appear, which render walking impossible; sometimes the cases terminate fatally from erysipelatous inflammation, or the exuded masses become softened, extensive abscesses being formed; the bulk of the affected part is thus diminished, or the disease terminates in gangrene. There is also atrophy of the muscles, the neurilemma of the nerves is thickened and hyperæsthesia is thus induced, the bones also are thickened. In elephantiasis of the genitals coition is still possible if the hypertrophy is not considerable.*

Treatment. In sporadic cases, and when the disease is seen at an early stage, we may arrest the progress of the hypertrophy by the following method:—The affected part is to be kept at rest in the horizontal position, and damp linen or caoutchouc bandages tightly applied; the inequalities in the surface being filled up with charpie or cotton wool, so as to maintain uniform pressure. As the result of the pressure, the serous infiltration of the skin and subcutaneous tissue, diminishes, and within even a few days, there is marked decrease of bulk: after a time, however, the effect is but gradual, as the denser tissues remain unaltered. The plaster dressing has no special advantage, as it loosens as soon as the ordinary bandage. The local application of caustic potash and iodide of glycerine also tends to diminish the bulk of the part. In cases in which the disease is associated with incurable ulcers, amputation is advisable, as the limb is useless to the patient and causes great inconvenience from its weight. If the scrotum be the seat of the disease, removal is the only treatment. In recent times, ligature or compression of the main artery has been followed by good results.

Hypertrophy and Ulceration of the Skin with Amyloid Degeneration.

The first case of this kind was published by Lindwurm and Buhl. O. Weber had previously observed amyloid degeneration of the cutaneous capillaries of the face. Bärensprung, a similar condition at the base of indurated chancre, and I observed it as a senile change in the skin.

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* Lambroso (Giornal. delle mal, della pelle, 1866, abridged in the Arch. for Dermat. Vol. 1. p. 128) describes a remarkable case of general hypertrophy (makrosmie). The patient (æt. 21) noticed that his body increased in bulk so much during four months that he was obliged to have his clothes frequently enlarged; his appetite became voracious, and he suffered from pain in the bones, joints, and stomach, as well as general debility. After the disease had lasted sixteen years, Lambrosa found the weight of the body 120.4 kilogr., the skin dark-yellow, the hair of the beard scanty, the hairs of the head brittle, the face resembling that of a lion, the zygomatic bones widely separated, the lower maxillæ broad and long, the skin of the under lip, neck, shoulders, and thorax very much thickened, as also that of the forearm, hands, and feet. The skin was of a reddish-yellow colour, the forearm, foot, and face remarkably hypertrophied.

The case described by Lindwurm and Buhl was that of a man æt. 54; usually after the patient had bathed, an eruption of red maculæ appeared on the skin, which soon disappeared, but afterwards became permanent; this condition was attended with itching, desquamation ensued, and the case resembled psoriasis or pityriasis. The maculæ increased in number and extent, thin crusts being first formed, which later, became thicker, and on the removal of which serous fluid exuded. The entire cutaneous surface was affected. On the scalp there were numerous reddened patches (closely grouped, circumscribed, and of variable size) covered with minute, thin, and silvery white scales (pityriasis rubra). When the scales were removed the exposed cutis appeared dry and reddened. These scaly patches were most distinctly seen on the hairy scalp, external ears, forehead, and nose, and on the upper eye-lids which were somewhat swollen. The eyelashes were normal, the conjunctiva somewhat injected; the skin of the neck, trunk, and extremities presented similar conditions in a more marked degree. The cutaneous surface was covered with a red efflorescence (variable in extent, roundish, somewhat prominent, and resembling wheals) with intervening normal portions of skin of a white or brownish tint. These wheals were covered with white scales, which were easily removeable, and exposed a smooth, dry, and red surface, which was not moist or bleeding. The largest of these infiltrations had a diameter of an inch, and occurred chiefly on the chest and neck. On other parts of the chest large tracts showed closely aggregated red papules, being irregularly thickened and covered with minute white scales (lichen ruber) (?). On certain parts of the anterior surface of the thorax, but chiefly on the forearms and legs, there appeared wart-like growths (closely aggregated, and measuring vertically several lines) which were found on microscopic examination to consist of papillary eminences, covered with thick masses of epidermis. These wart-like growths exactly resembled ichthyosis histrix or cornea; on other parts, the irregular, rough, and thickened skin presented rather the features of ichthyosis simplex. The palmar surfaces of the hands were thickened (parchment-like) and covered with scaly masses and epidermic lamellæ, the folds of the skin showing deep and very painful fissures and cracks. The dorsal surfaces of the hands were covered with the red and scaly eminences just described. Movement, especially the extension of the fingers, was thereby rendered difficult and painful. On the entire cutaneous surface were distributed larger or smaller ulcers, which according to the statement of the patient had been produced by scratching. The patient complained of extreme sensibility and pain in the skin, independently of his other sufferings. The skin had a variegated aspect.

Buhl examined the skin microscopically with the following results:—The epidermis was heaped up in irregular thickened layers, the densest masses being split into thick horny scales; its cells, however, showed no essential alteration. The only change observed in the rete Malpighii was a slight increase in its extent, and at parts—brownish coloration. The size and form of the papillæ, however, were remarkable; they were rarely simple, being almost always compound, and usually club-shaped; they were enlarged to three or six times their normal size (as found by the micrometer) in vertical diameter from 1/5 to 2/5′′. The club-shaped rounded point frequently displayed superficial or deep grooves, showing that it was composed of several papillæ. The most important change, however, was observed in the stroma of the papillæ, which was studded with lustrous bodies (varying from 0.008 to 0.1 Mm. or more in diameter) distinctly grouped, closely aggregated in longitudinal rows, of apparently without any order. The microscopic appearance of these bodies and their reaction with iodine and sulphuric acid left no doubt as to their amyloid character. These minute bodies appear at the base of the papillæ, and most abundantly at the club-shaped dilatation. By fine sections it was found that not only was the well-known iodine and sulphuric acid reaction more marked, when these bodies were large and lustrous, but also that the power of absorbing a solution of carmine was lost. The hair and sweat glands were normal, the spiral ducts of the latter, however, were apparently destroyed in the thicker layers of the epidermis.

The morbid process, therefore, does not consist merely in a simple hypertrophy of the papillary body and of the epidermis which covers it, the essential feature being the excessive development of the capillary loops, which not only are dilated and branching, but exhibit marked increase and amyloid degeneration of the nuclei of the vascular walls. This degeneration must now be regarded, first, as the cause of the resistance of the vascular walls and of the augmented hæmophilic condition of the affected parts; second, as the cause of desiccation and shedding of entire papillary layers, which results from the occlusion of the vessels, and also of the ulceration. The cells of the deeper layers of the cutis (not produced from nuclei undergoing amyloid degeneration) were then concerned in the healing of the ulcerated parts and the formation of the smooth white cicatrices.

2. *Sklerema, Skleroderma, Teleosklerosis rheumatica, Sklerostenosis.*

This rare variety of hypertrophy of the skin (forty cases of which have been recorded by *Gamberinus, Villemin, Köbner, Wernicke, Bazin, Arning, Auspitz, Binz, Gintrac, Nordt, Förster, Thirial, Gilett, Putegnat, Curzio, Royer, Forget, Leisrink, Rasmussen, Paulicki,* and others) occurs in adults as well as in children, involving only part of the skin or the entire cutaneous surface. In the former case the affection is termed *skleroderma,* in the latter, *sklerema neonatorum.*

a. SKLERODERMA.

The development of this skin affection is usually slow; the first symptom observed by the patient is stiffness and immobility of certain parts of the body, and mostly the neck and face, Thus movement of the head is difficult if the neck be affected; in sklerema of the face, the expression and play of feature are impaired, the lines and furrows obliterated (*Gilette*), the eyes are half shut, the nostrils distended, the nose is swollen and infiltrated (rhinosklerema, *Hebra*), the abdominal walls are hardened as well as the scrotum and penis (erection being prevented); the elbows are bent, the fingers half stretched, (claw-like), vertebral column bent forward; respiration also is impaired if the thorax be affected by sklerema. The skin is hard like wood or leather, and cannot be lifted up in folds; this stiffness is most marked in the scalp, forehead, eye-lids, and cheeks; sensibility, the perspiratory function and perception of temperature are unimpaired; the secretion of sebum continues, and even the efflorescence of acne (*Köbner*) and comedones may be seen.

Etiology. Most observers are agreed in regarding this affection as occasionally due to a preceding attack of rheumatism. The statistics as to age and sex show that 20 patients were under the age of 35, that only 6 were above 40, and that women are most liable to this disease. As predisposing causes may be mentioned: disorders of menstruation, affections of the heart, and mal-nutrition.

I have twice had an opportunity of observing the disease, the first case occurred in *Hebra's* clinique, the second in that of *Dr. F. Fieber.* The first case has been fully described by *H. Auspitz* (Wiener med. Wochenschrift).

First case. From his fourteenth year the patient, F. K., æt. 29, had suffered successively from various diseases—typhus, inflammation of the lungs, and intermittent fever—these having no connection, however, with his present state; having been out of work for a year previous to his coming under our observation, he had undergone great privations and was infested by pediculi. At this time he noticed, first in the loins and later in the elbow joints, increasing and disagreeable stiffness of the skin, as if it were too small for his body, these parts assuming at the same time a darker colour. When he came into the General Hospital on the 4th Nov., 1862, the skin, especially on the abdomen, axillæ, and loins, presented various shades of pigmentation, and was extremely tense and lustrous, but not brittle. The patient was a strongly built muscular man of about the average stature; the lips were pale, the mouth contracted, and the expression of the face impaired: the skin of the forehead was tense, as also in a less degree that of the neck, so that the lateral movement of the head was accomplished with difficulty. The skin of the abdomen could be raised in small folds. On attempting to raise the upper extremities above the horizontal line, pain and tension were produced in the integument of the axilla and in that covering the pectoralis major; the forearm could be bent at a right angle only with pain; the joints of the lower extremities were unaffected. The hairs of the beard and head were normal. The patient perspired frequently and profusely. On examination of the other organs, the spleen was found to be considerably enlarged, the heart-sounds somewhat indistinct; the temperature of the skin and the secretory function were normal. Auspitz found a deviation from the normal sensibility only on the upper arm, neck, and chest.

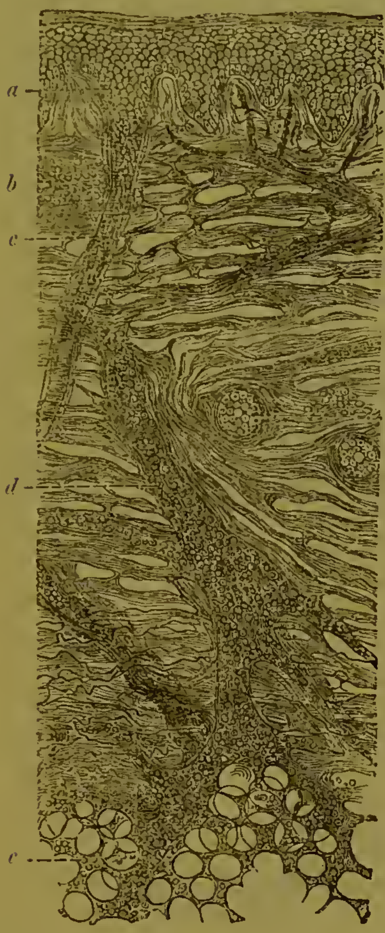
The condition of the patient remained unchanged during four months; during a febrile attack at the end of March, the face appeared puffy, and the urine for a short time contained albumen and epithelium. In April the patient had three attacks of intermittent fever, and from this time the presence of albumen in the urine was constant; from the middle of May the symptoms of Bright's disease became more evident, as the result of which there was marked impairment of vision, and the febrile disturbance and pain in the joints were considerable. On the 28th of May convulsions of the limbs occurred and unconsciousness supervened; the sight was entirely lost; and from the beginning of June there was vomiting of a greenish fluid, at a later period also diarrhœa, and the patient died on the 20th of June.

Second case. C., æt. 12, daughter of a tailor, had enjoyed good health from her infancy. In October, 1868, the skin over the left shoulder (corresponding to the fossa supra and infra spinata) presented a superficial, flat, and painless thickening, the surface of the skin showing a brownish pigmentation in the form of maculæ around and on the affected parts, as well as on the left half of the chest (corresponding to the pectoralis) and the entire left upper extremity with the exception of the axilla, extending from the acromion to the fingers. On these parts the skin gradually assumed a harder character, and the entire extremity became emaciated and stiff. The child and her relatives ascribed all these morbid changes to the blows which were said to have been inflicted on the patient's back and chest by a teacher. When she came into the hospital on the 3rd of May, 1869, the following phenomena were observed: besides the pigmentation and thickening of the skin just described, the skin of the entire left upper extremity was hard, stretched like a board, dark-brown, and could be lifted up in folds—it resembled a leather sheath; the skin also was covered with scales or had the aspect of glistening cicatricial tissue. The muscles of the extremity were atrophied; the elbow joint was fixed at a right angle and could be only slightly moved; movement of the fingers was much impaired, the integument of the hand was excessively tense and the fingers bent.

The electro-muscular contractility was almost normal. The use of vapour baths, and the external application of diachylon ointment (during several months) was not attended with any good results. After the galvanic treatment, however, the extensor surface of the upper arm felt soft, but the effect was less marked on the inner surface of the forearm; the motor power was improved in all the joints, and the pigmentation partially removed.

Anatomy. In the first case (which was very advanced) the necroscopy established in addition to Bright's disease, hypertrophy of the left ventricle, bronchiektasis in the middle lobule of the right lung, and chronic enlargement of the spleen, the following:—The general integument (especially that of the abdomen) was of a dirty-brownish tint, the thickness of the Malpighian layer unchanged, the cylindrical cells adjoining the papillæ showed nuclei surrounded by dark-brown granular pigment (Fig. 29); the cellular contents displayed an uniform brownish tint; in the more superficial layers the pigment was less abundant. The papillæ of the corium were traversed by connective tissue corpuscles, the capillary vessels in the papillæ were not dilated. The larger vessels of the cutis, as far as the cutis vera, showed clumps of brownish pigment, partly in their own walls, partly in the surrounding connective tissue. There was also a pigmentary deposit in the cellular walls of the ducts of the sweat-glands, in the external root-sheath of the hair, and the epithelium of the sebaceous glands. On microscopic examination the tissue of the cutis vera (especially on the chest, and less so on the arm) showed somewhat marked increase of the connective-tissue bundles, and abundant elastic fibres; the same increase was also observed in the subcutaneous connective tissue which was deficient in fat. The sebaceous follicles and sudoriparous glands were normal.

Fig. 28.



Section of sklerema. Second case. *a.* Pigmented rete Malpighii. *b* Cell-growth in the cutis. *c.* Excretory duct of a sweat gland. *d.* Cell infiltration in larger tracts. *e.* Cell infiltration around panniculus adiposus.

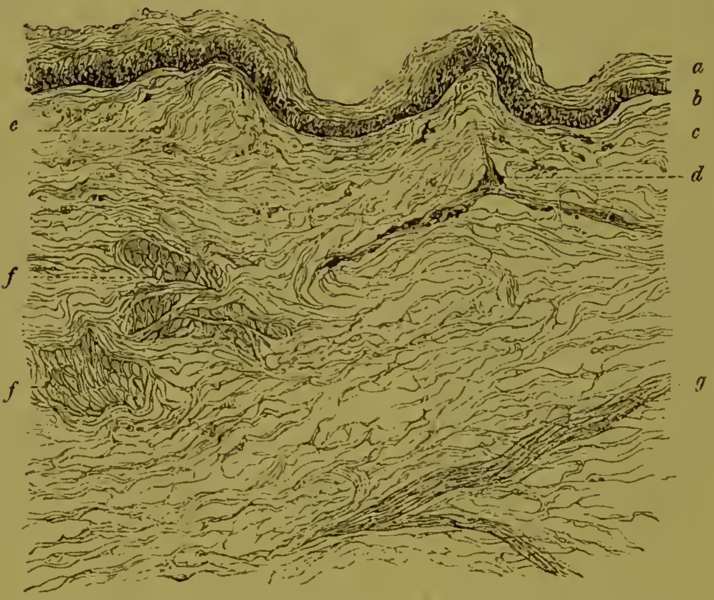
In the second case, excised portions of the skin, hardened in chromic acid and examined microscopically, showed the following changes. The cells of the rete Malpighii are filled with granular pigment (Fig. 28); the papillary layer is unchanged, and into it extend compressed interlaced bundles of connective tissue which have lost their power of expansion in dilute acetic acid. This sclerotic degeneration of the corium extends to and encroaches on the adipose tissue, which thus becomes blended with the sclerotic or connective tissue. The corium is thus considerably thickened. In the sclerotic corium there are also observed accumulations of connective cells which form strands or separate the groups of fat-cells. The hairs occur sparingly, but the sebaceous glands appear largely: there are also bundles of nerves. The coiled spiral ducts of the sweat-glands are seen on transverse section to be separated, the interstices being occupied by fibrous connective tissue.

Microscopic examination of Arning's case showed considerable hypertrophy of the elastic tissue fibres,—papillæ and capillary vessels of the skin being normal; close beneath the papillary layer, however, a dense mesh-work of elastic fibres was seen, which became thicker the deeper it was situate; development of elastic fibres was also observed in the mucous membrane; the glands and hairs of the skin were unchanged. In Förster's case, there was chiefly hypertrophy of the subcutaneous connective tissue, that of the elastic tissue being inconsiderable. Rasmussen (Edinburgh Med. Journal, 1867) found in the corium (consisting of connective tissue and elastic fibres), the vessels distended, round, spindle-shaped nuclei adhering to the appendages.

Prognosis. The majority of cases hitherto observed were chronic, and the healing process therefore commenced only after the affection had existed for a long period; other cases proved fatal from complications with diseases of the heart, tuberculosis, erysipelas, and, as in our case, with Bright's disease.

Treatment. The remedies most recommended are quinine, cod-liver oil, and iron; also vapour and aromatic baths, galvanism, ointments of oxide of copper (*Gresson*), mercury, and iodine, as well as preparations consisting of tar, glycerine, and starch.

Fig. 29.



a. Epidermis. *b.* Richly pigmented Malpighian layer. *c.* Dense fibrous cutis. *d.* Isolated vascular strand (pigmented). *e.* Minute clumps of pigment. *f.* Transverse section of muscular fibres. *g.* Prolongations of muscular fibres.

b. SKLEREMA NEONATORUM, (*induration of the cellular tissue in infants.*)

This disease mostly appears in the first month of life, but sometimes also in the second and third year; the yellow or reddish skin gradually becomes paler, harder and stiffer, the abdomen and face being first invaded. These phenomena disappear gradually in the case of well-nourished children, and the temperature (previously low) and respiration become normal, or complications with various circulatory disorders supervene; the fatal result being sometimes due to hypostatic pneumonia. The causes of this affection are chiefly congenital debility, disturbance of the circulation,* diseases of the navel, and wounds, as for instance, circumcision.

The skin in such cases presents, in addition to the stearine condition, lymphatic infiltration of the panniculus adiposus and slight growth of connective tissue in the deeper layers of the corium (*Förster*). *Löschner* found the corium considerably thickened, containing numerous round and longitudinal masses (Heerde) of embryonic connective tissue and nuclei, the former around the adipose tissue. *Chevrent* found in the blood of children who had died of icterus-sklerema, two kinds of colouring matter which did not resemble the bile pigment, but appeared to be a modification of the colouring matter which *Henning* has described as "indigo-like."

Treatment. The warmth of the body must be maintained artificially by blankets, frictions, etc., but the most important indication is nourishing diet, and quinine as a tonic.

CLASS V.

ATROPHIC AFFECTIONS.

THE term atrophy denotes the waste of the elements of the textures without proportionate restitution, either an insufficient supply of material being produced, or the destruction exceeding the repair. We distinguish—1. *true atrophy*, in which the elements are diminished, or absent; 2. *numerical atrophy*, in which the number of the elements of a tissue has decreased; besides these we have a *qualitative atrophy,* in which the elements degenerate, and a *necrobiotic atrophy* (*Virchow*), in which the elements are entirely destroyed. Atrophic affections depend upon decreased supply of blood, as the result of impermeability of the capillary vessels, excessive activity of an organ, anomalies of growth, irritation, pressure, absorption, etc. (*Rokitansky*). We include in this category also fatty and horny degeneration, induration, calcification, cheesy and amyloid degenerations, senile changes, etc.

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* According to *Löschner* (Prager Vierteljahrsch, 1860), sklerema frequently depends on deficient nourishment and care; perhaps also on chronic diseases of the lungs, liver, and intestines; sklerema also appears as the result of stasis congestion of the capillary veins, or of vascular disturbances. *Henle* and *Riegler* maintain that sklerema is due to an insufficiency of the absorbents. Pastorella ascribes it to lymphangiotis.

1. ATROPHY OF THE CUTIS.

In addition to the ulcerative process which terminates in the formation of cicatricial tissue, atrophy of the corium and epidermis results from pressure of tumors and induration of the skin, as for instance, in clavus, etc.; from pressure the vessels become shrivelled and the blood-supply of the corium impaired; the tenser the skin the more rapid is the atrophic process; the cutis becomes thin, lustrous, and transparent; the lines and furrows disappear, the extent of the papillary layer also decreases; finally, the epidermis bursts, exposing the rete Malpighii. Atrophy also occurs as the result of chronic skin affections, as lupus, prurigo, favus, etc. To this class belong also the cicatrices of pregnancy and the wrinkles of the skin (chiefly on the buttocks and thighs) appearing in corpulent subjects after exhausting diseases, as typhus. *B. S. Schultze* (Jena'sche Zeitschr., 1868) observed that the formation of cicatrices was more frequent in women (even in those who have never borne children) than in men; that in the former, also, the cicatrices on the thigh are more longitudinal (depending on the form and mode of growth) whilst in the latter they are more transverse.

2. THE SENILE CHANGES OF THE SKIN.

The atrophic affections of the skin resulting from the physiological process of decay, are now to be described in detail. If we begin with the changes in the cutis, the most striking phenomenon is the decrease in thickness, and this is especially seen in the papillæ. On those parts where the papillæ are normally small, as on the forehead and abdominal wall, the Malpighian layer in the senile skin runs parallel with the smooth corium, and on those parts where the papillæ are most developed in middle age (as on the points of the fingers), they are considerably shortened in the senile skin, also diminished in size, and in some this is marked in such a degree that they appear completely occupied by the touch corpuscles or capillary vessels. These changes may be designated as corrugation, which necessarily alter the direction of the appendages. The corrugated skin displays numerous modifications indicative of the retrograde metamorphosis, the degeneration presenting itself:—1. in the presence of extremely minute granules interspersed uniformly throughout the tissue, 2. in larger granules distinctly separable. In the first case, the fibres of the original tissue are not to be distinctly recognized; in the second, however, the fibres and their interlacement can still be traced, forming a network, in the interstices of which are deposited the granules, which sometimes appear in short rows.

These two forms of degeneration are to be distinguished from a third change, which is termed *colloid degeneration* (*Rokitansky*) vitreous, amyloid or hyaline degeneration (*O. Weber*), and which presents the aspect of coagulated lime. Fatty degeneration may be regarded as a fourth variety of senile change, and pigmentary deposit as a fifth form.

The two first varieties are frequently met with, the others are rare; it is also to be noticed that the minute and large granular degenerations are frequently associated, *i.e.*, the minute granules being observed in the deeper, and the larger nuclei in the superficial layers of the cutis.

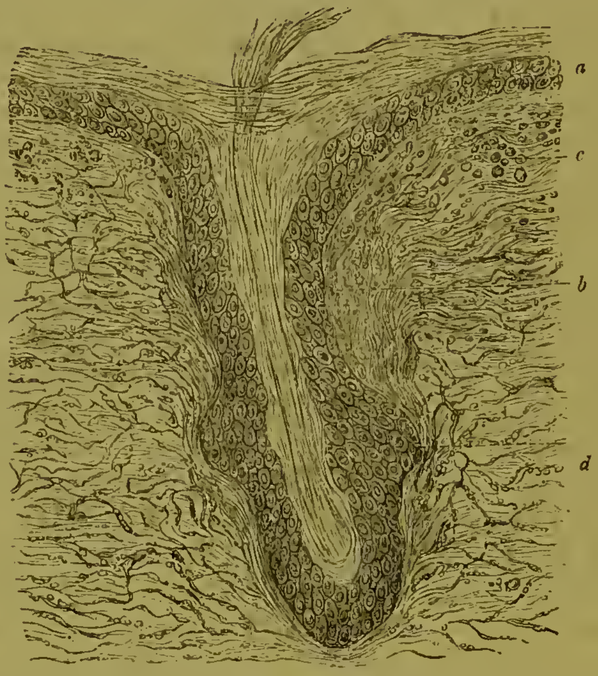
1. This degeneration is indicated by minute granules which occur abundantly, substituting almost entirely the fibrous connective tissue; they are unaltered by ether, alcohol or carmine. The cutis presents a milky or albuminous aspect.

2. Degeneration shown by larger granules (Fig. 30) is more frequent in the superficial than in the deeper layers: in such cases the cutis on section appears greenish or yellowish in colour, and the granular structures are rendered more distinct when treated with carmine, ammonia, and acetic acid. These structures, however, absorb but slightly, and appear shrivelled rather than enlarged on the addition of these re-agents. When examined with high powers the granules may frequently be observed in rows. The granules, it may be supposed, are formed by the shrivelled fibrous masses.

It appears to me that these two forms of degeneration differ only in degree, and I regard the minute granules only as the later change, the more so as in the same cutis they appear in separate groups (Inseln) or in rows.

3. Hyaloid degeneration (glasartige Verquellung) Fig. 31. In this form the fibrous bundles of the cutis have entirely disappeared, and are replaced by a homogeneous mass, which greatly resembles coagulated gelatine; the nerves and vessels are apparently destroyed, as also the other appendages of the skin. The entire cutis is extremely thin and, on section, appears longitudinally and transversely fissured, but this is probably due to the mode of preparation, and the friable nature of the tissues. These changes are similar to those observed by *Lindwurm* and *Buhl* in a case of hypertrophy and ulceration of the skin with amyloid degeneration, by *O. Weber* in the cutaneous vessels of the face, and by *v. Bärensprung* at the base of indurated chancre; the con-

Fig. 30.

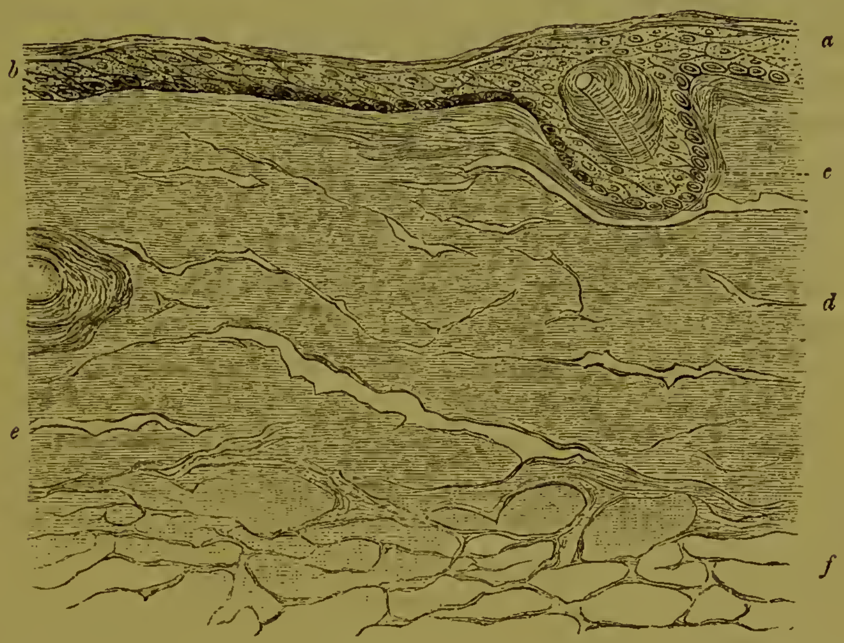


Section of senile skin (from forehead) showing granular degeneration and pigmented cutis *a.* Granular pigment in rete Malpighii, outer root-sheath and cutis. *b.* Granular degeneration. *c.* Delicate fibrous connective tissue. *d.* Dilated hair-follicle with increased accumulation of cells of outer root-sheath.

dition will be described under Elephant. Græcorum. In every case the degeneration commences in the vessels, and indicates therefore a deep-seated nutritive disturbance of the entire organism.

O. Weber describes this condition as *hyaloid* degeneration. According to this author, the morbid process generally proceeds from the smallest arteries, and extends at a later period to the parenchymatous cells of the affected part. It would appear that the morbid process commences in the epithelium of the arteries, afterwards extending to the entire vascular walls, which assume a homogeneous aspect. The calibre of the vessel is thus diminished, and the other tissues are soon involved. *Weber* believes that in this process the protoplasm itself becomes changed from the deposition of morbid material by the blood. In regard to the genesis of this epithelial metamorphosis in the vascular walls, further investigations are required to show whether the epithelial cells of the small arteries are really the starting point, as in other organs we can demonstrate the origin of similar pro-

Fig. 31.



Hyaloid degeneration (from the skin of forehead). *a.* Epidermis. *b.* Deeply pigmented rete Malpighii. *c.* Pigmented outer root-sheath. *d.* Hyaline degeneration of cutis. *e.* Fissures caused by section. *f.* Delicate fibrous net-work of panniculus adiposus. *g.* Follicle with horny epidermic cells in deeper portion of cutis.

cesses externally to the epithelial structures, which are bulged inwards, the calibre of the vessel being thus diminished, *e.g.*, as in the cerebral arteries.

Although all these changes may involve the entire skin, there are certain parts, as the face and neck, where they are mostly seen: the changes become more marked with the age of the patient, and in all individuals over fifty years of age, I found one or other of these retrograde metamorphoses. The special liability of the skin of the face to these changes, may be attributed to the direct action of temperature and other external agencies, as well as to the action of the muscles of expression in producing frequent and variable tension. In women the neck is also involved (probably as the result of the stretching of the skin during pregnancy). It may here be mentioned that in such cases we frequently find cell infiltration, which is the result of preceding inflammatory conditions, and unconnected with the true senile changes.

Pigment appears in the form of brown granules embedded not only in the cells of the rete Malpighii, but also in those of the upper portion of the external root-sheath of the hair, and even in the tissue of the cutis, in which it occurs either in diffused yellowish brown masses, or in aggregated granular pigment cells. On the legs it frequently occurs in the cutis; in the scrotum, however, only in the rete Malpighii. These pigmentary accumulations are mostly irregular, and always indicate preceding disturbances of circulation.

Smooth muscular fibres. There is no doubt that these changes also involve the smooth muscular fibres of the cutis, as shown by the diminished contractility of the senile skin. This retrograde change would appear to be indicated by a degeneration of the fibre-cells, which exhibit numerous minute granular deposits, the staff-like nuclei (stäbchenförmige Kerne) being shrivelled; as the result of which the muscle assumes an appearance similar to that which *Wedl* has described in the *tensor choroideæ* (S. Atlas für pathalog. Anat., 1863).

Epidermis. The rete Malpighii is often extremely thin, its cells being accumulated only in small numbers, so that the epidermis and derma are closely approximated; this accounts for the difficulty in removing the epidermis from the cutis, even when the section is most carefully made. The cells of the Malpighian layer are mostly shrivelled, also frequently pigmented; they do not readily absorb carmine, and are but slightly enlarged on the addition of acetic acid. The epidermis is dry and brittle, of a dirty colour, and appears furrowed, as the result of the shrivelled condition of the cutis; the cells are more easily separable, and the entire structure presents a rugged aspect (zerklüftetes Aussehen). On some parts, especially on the back and chest, the epidermic cells are aggregated and piled up in several layers, on a smooth surface, or on the remains of separate papillæ, thus forming wart-like excrescences which (from the absorption of abundant granular pigment) are of a yellow-brown or black tint; by the scratching of the nails they are easily removed, leaving a bleeding corium.

Vessels and nerves. In every case the vessels are dilated, not only between the separate fat-clumps of the panniculus adiposus, but also in the superficial portion of the cutis and even in the papillæ, in which they display an extremely tortuous course. Obliteration of the vessels is described by several authors as a constant phenomenon, but I observed it only in cases in which colloid degeneration was apparent.

Hairs. In addition to the alteration in colour (which has been noticed in detail) the most important and interesting senile change is the loss of the hair in old age; this must not be confounded, however, with the normal alternation of the hair,—a process described in the preceding pages.

According to *Kölliker*, permanent loss of the hair is due to atrophy of the papillary vessels; in colloid degeneration of the cutis (one of the rarest forms) this atrophic condition is most marked. As I have already stated in reference to other parts of the senile skin, the vascular system of the papilla, instead of being atrophied, is largely developed; and I am therefore led to the conclusion that the cause of the loss of hair is the retrograde growth (Rückbildung) of the cutis, the hair papilla like the other cutaneous structures being involved in the process: the influence of the nervous system is also to be taken into account.*

In this change the process is doubtless similar to the normal alternation of the hair, for there is a fresh supply of blastema which, however, never originates a new growth. On bald parts I have sometimes found perfect hair-follicles which were destitute of hairs, but showed at their base a clump of dark tinted cells; within this cell-mass, however, I was unable to discover any remains of the papillæ. In the majority of cases of baldness in young people, and in those in which this condition is recent, downy hairs were found in the follicles, the latter structures being doubtless sometimes renewed, as I found the hair-bulb split, and the canal closed at the base—the condition existing when a hair is falling out.

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* *Pincus* (Virchow's Archiv, 1866) found, on examination of bald parts, the deeper layers of the cutis thin; on the atrophic bald parts, the panniculus adiposus also was thickened. These observations, therefore, accord with the results which we have obtained.

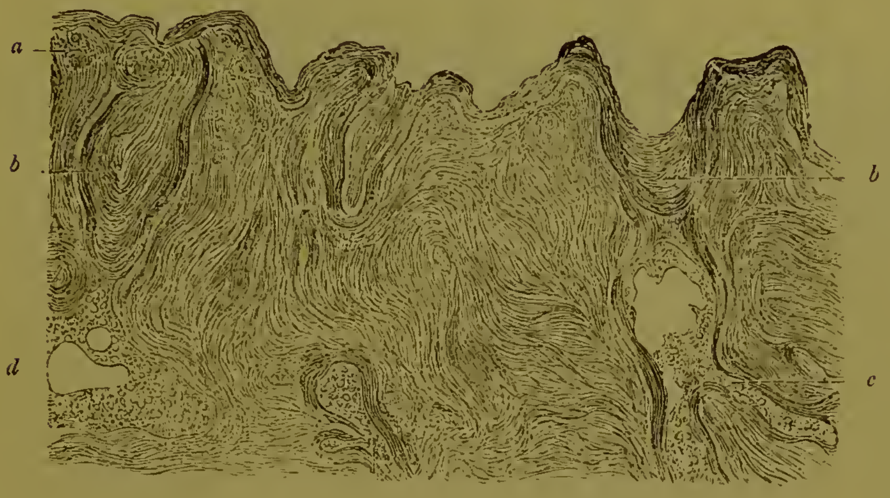
I may here record an interesting observation in regard to the arrangement of the hair: occasionally I found several downy hairs (as many as three) protruding from a follicle; this condition, however, was not due to a connection between the growing hairs with those about to be shed (on a single papilla), but to the division of the base of the hair-follicle into three indentations (Buchten), each of which contained the root of a hair which appeared split. As it is frequently enough observed that several hairs originate in a single follicle, and as this is of constant occurrence in many races (*e.g.*, Negroes), I have no hesitation in regarding the condition as a normal one.

In senile baldness, the scalp is usually destitute of hairs, even the lanugo being eventually shed. The cause of this will, I believe, be found in the irregular deposit of the hair-blastema (already described) which evidently takes place only as the result of the more advanced degeneration of the skin. I find that the root-sheaths—especially the inner one—are split, their epidermal lamellæ are thrown off and mingled with the smegma, forming a detritus which surrounds the hair, and frequently distends the follicle. Lastly, when the function of the follicle is so much impaired that hair-blastema is no longer produced, the base is completely obliterated and only the upper portion of the follicle (into which the glands open) is left entire. This upper portion of the hair-follicle (Fig. 32) now assumes the functions of an excretory duct of the sebaceous gland, and the latter structure (which formerly opened laterally into the follicular wall) now discharges its secretion directly at the base of the shortened follicle, where the smegma accumulates in large quantity, thus distending the follicle; so that the condition of the follicular gland, termed *milium,* may involve not merely the gland but also the hair-follicle.

The connective tissue of the hair-follicle (Fig. 33) remains unaltered long after the hair has fallen out, and the adjacent cutis involved in the granular degeneration. These remains of the hair-follicle are also observed in other conditions (Elephantiasis Græcorum); in the vicinity of a bundle of normal connective tissue, we find abundant cell-proliferation, the normal tissue of the cutis being thus totally obliterated: in this bundle we observe a coil of downy hair. These fibres (as shown in sections) are observed to extend from the surface to the deeper portion of the cutis, where they become interwoven with the tissues. On the addition of acetic acid, these bundles are more readily distinguished from the adjacent structures.

In regard to the other conditions observed in baldness, authors are at variance. *Bichat* could not discover any hair-follicles on bald parts, whilst *E. H Weber* and *Simon* distinctly observed them. According to my investigations, these structures are not completely destroyed, but rather shrivelled; or the root-sheaths disappear, whilst only the connective tissue portion remains, the bundles of which (as above described) are arranged in broad strands (*Zügen*), in the superficial portion of which the lumen of the hair-follicle (occupied by epidermic cells) may be distinguished as a minute groove (ruga); even on parts at which colloid degeneration had taken place the section showed fragmentary remains of the follicles. In one interesting case I found the upper part of the hair-follicle occupied by epidermic cells, and separated from the lower part, which was completely occupied by friable masses.

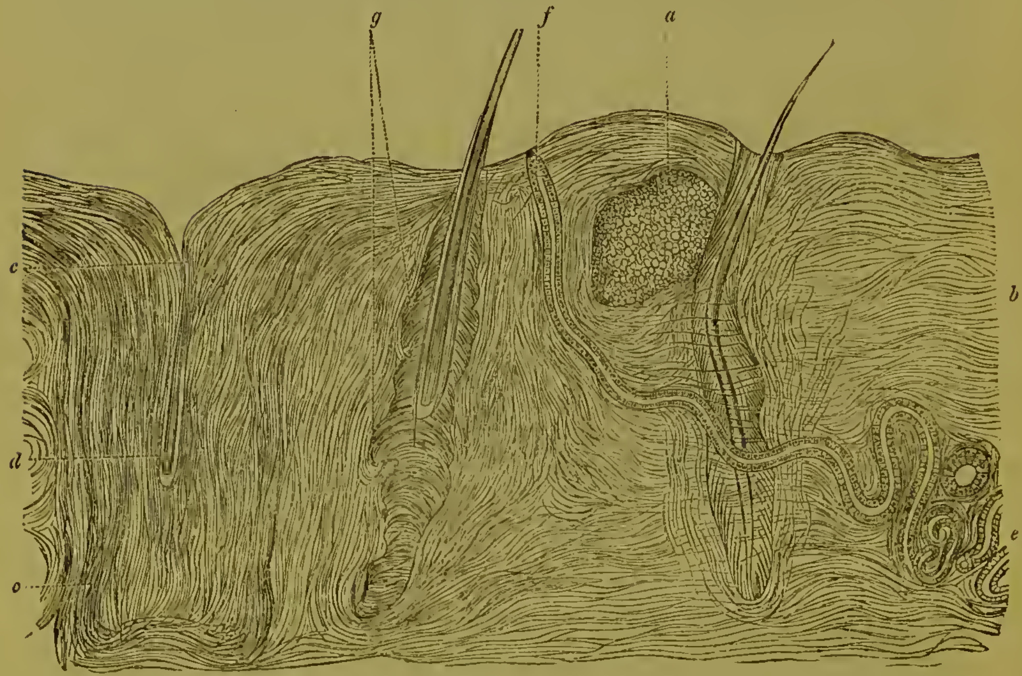
Fig. 32.



Section of senile skin from forehead (advanced degeneration) in which are seen the shrivelled hair-follicles with epidermic and sebaceous contents; at the base of the follicles appear the distended sebaceous glands which open unto them. *a.* Cutis with punctated granular degeneration. *b.* Shortened hair-follicle with outer root-sheath. *c.* Epidermoidal cells filling hair-follicle. *d.* Segments of distended sebaceous glands.

Outer root-sheath. The cells of the outer root-sheath sometimes appear perfectly normal; frequently, however, they are accumulated at the base of the hair-follicle, and replaced by epidermic cells at the upper portion of that structure. The cell-accumulations at the base produce those club-shaped elongations and dilatations of the follicle which I have observed in *lichen exudativus ruber* and other chronic skin diseases. The cells frequently appear shrivelled* and pigmented (at the upper part of the root-sheath); in the latter structure I also met with fat granules and molecules.

Fig. 33.



Section of senile skin (from forehead) in which are seen the wall of the hair-follicle with the remains of a downy hair, as well as the plug-like accumulation of the cells of the outer root-sheath and the excretory duct of the sweat-gland. *a.* Degenerated cutis. *b.* Wall of hair-follicle, connective tissue strands towards the surface merging into thin layer of connective tissue bundle not yet degenerated. *c.* Ruga. *d.* Remains of downy hair. *e.* Sweat-gland with yellowish granules. *f.* Duct of Sweat-gland. *g.* Accumulation of cells of outer root-sheath.

Sebaceous glands. As is well-known, the senile skin is dry and brittle, a condition depending upon the changes in the sebaceous follicles; these structures appear to the naked eye as yellowish points. The changes vary according to the existence of downy or thick hairs, or the absence of hairs at the part.

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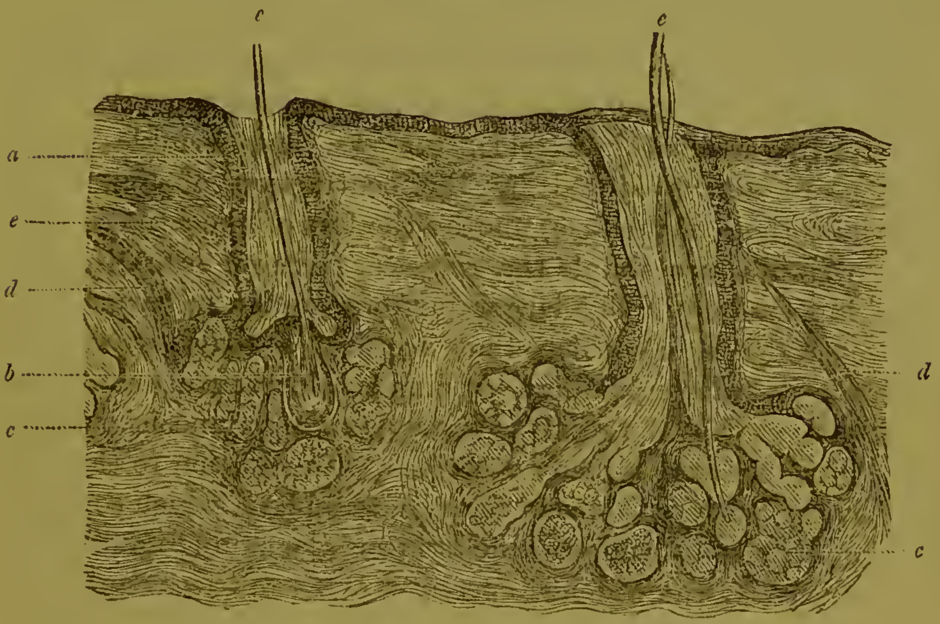
* These cells are not colored by carmine, nor are they rendered more distinct by the action of acetic acid.

On parts furnished only with downy hairs, the sebaceous glands are either completely destroyed, or changed into cyst-like structures (*milium, grutum*); frequently, however, they are only distended and filled with sebaceous matter, which is normal or of a brownish-yellow colour. On parts richly provided with hairs, the sebaceous glands are distended (Fig. 34), but retain their acinous structure, and remain as lateral appendages of the hair-follicle; or they are changed into roundish or oval structures, situate beneath the hair-follicle. On the bald scalp they attain their largest size.

Fig. 34.



Section of bald scalp, the woolly hairs of which are fissured, the outer root-sheaths of which appear as club-shaped processes; the hair-follicle glands are distended, and from the shortness of the follicle the excretory duct appears beneath them. *a.* Hair-follicle with horny cells (chiefly on its upper part). *b.* Downy hair split at the base like a pencil-brush. *c.* Greatly enlarged hair-follicle gland, situated beneath the shrivelled follicle. *d.* Arrector pili. *e.* Transverse, smooth muscular fibres.

Sweat-glands. The changes in the sweat-glands are not so remarkable as to account for the decline of the perspiratory function in old age. I found the sweat glands as numerous in the senile skin as in that of the young; the only condition worthy of notice, was the accumulation of a brownish or yellowish substance in the sweat-glands of the axilla, forehead, and other parts (as described by *Kölliker*), as the result of which the glandular ducts appeared distended. I may also notice a condition of the excretory duct, which I believe to be abnormal; in the senile skin of the forehead I have frequently observed the glandular aperture somewhat displaced, and at a considerable distance from the gland, the excretory duct of which displayed a wavy course in passing through the cutis (Fig. 33).

Adipose tissue. The extent of the panniculus adiposus varies so much that its alterations are indefinite; in cases in which the fat had disappeared I found the connective tissue thickened.

Wrinkles. As the cutis becomes thinner and less elastic from the changes in the connective tissue and smooth muscular fibres, it is readily thrown into folds, furrows, and wrinkles; these fissures are also produced by the contraction of the muscles (especially those of the face) and by the loss of the adipose tissue. These wrinkles are simple (*i.e.* ridges or furrows) or multiple (*i.e.*, branching fissures). The larger furrows ramify in various directions over the skin, which thus acquires a rough surface, the epidermic and Malpighian layers being similarly involved. Lastly, wrinkles appear as the result of those forms of cutaneous degeneration which we have already described. In addition to the ridges and furrows, there is a second form of wrinkling, which consists in sac-like (blindsackförmigen) puckering of the skin (Fig. 32): these are produced by the widened apertures of the sebaceous glands, as well as those of the shortened hair-follicles, which are widened at the surface. We also observe larger depressions (Buchten) which at their base communicate with the sebaceous glands; these little sacs contain sebum, epithelial detritus and lanugo hairs.

Contractility and elasticity of senile skin. In reference to this condition, *C. Langer* has recorded certain observations (Sitzungsber. der k. Akad. der Wissensch., 1861); I have also instituted experimental researches on the subject by means of the modified apparatus of *Prof. Hering*. The results showed that in the senile skin the elasticity and contractility are diminished; I found considerable differences in elasticity in longitudinal and transverse portions of the skin. I also observed that the retraction of the little pieces (which were placed on a moist glass plate after having been stretched) was less complete in the senile, than in the young skin, the former remaining extended several millimetres. The senile skin when stretched does not return to its original bulk—this condition being evidently dependent upon the retrograde degeneration already described.

The senile changes of the integument, therefore, consist chiefly in degeneration of the tissue of the cutis, which becomes thin and shrivelled, changes which are variously termed fine granular degeneration, senile atrophy, hyaloid formation, etc.; similar changes had previously been observed in the skin and other organs, but the condition which I have termed "senile shrivelling" (Verschrumpfung) has not hitherto been noticed. These changes are associated with general nutritive disturbance in old age, by which all the functions are impaired. The destructive process is not uniform, being more marked at some parts than at others: in the epidermis there is cellular hyperplasia, forming wart-like excrescences, the horny change and shedding of the cells being irregular. The loss of hair (an epithelial structure) is due to degeneration of the papilla, as one of the constituents of the cutis, and to the deficient formation of epithelium. The hair-follicles are not completely destroyed; the deeper part is shrivelled, and the superficial portion forms the excretory duct of the sebaceous gland. There are pigmentary deposits in the epidermis, in the root-sheath, and also in the cutis. Lastly, the marked loss of elasticity and contractility in the skin, is also a senile change.

The anatomical results would appear to indicate important nutritive disturbance in the skin; with regard to the secretions, we have not yet succeeded in tracing the effects produced by the general senile change.

3. BLANCHING OF THE HAIR.

The hair derives its colour from the cortical layer, but neither in this nor in the medullary substance is there any appearance of pigment granules. There may be congenital absence of pigment in the hair, lasting throughout life, as in the case of albinos; or variations in colour may take place,—hairs which were originally light assuming a darker tint, and changing to white in old age. The change to grey commences in the hair of the temples, extending at a later period to that of the entire scalp and body; this change is usually gradual, although cases are recorded in which the hair suddenly turned grey as the result of violent emotion. In addition to certain cases in which the hair suddenly turned grey (*e.g.* Sir Thomas More and Marie Antoinette, etc.,), which not been investigated scientifically, several instances of this have kind have been described in recent times. *Landois* records the case of a patient, suffering from delirium tremens, whose hair, which was of a dark colour, turned grey in a single night after a violent fit of passion lasting several hours. Microscopic examination of the hair showed numerous air-bubbles, both in the medulla and cortical layer; the hairs appeared dark by transmitted light, and white by direct light. On saturating the hairs with ether and oil of turpentine, *Landois* observed that as the fluid percolated the hair, the spaces disappeared and the colour was changed. He believes this alteration in colour to be intimately associated with disorders of the innervation, which act depressingly on the system.*

The blanching is usually uniform in the entire length of the hair, although it sometimes happens that the lower portion is fair and the extremity dark; the latter condition is found especially in diseases of the scalp. The colour of the hair is sometimes altered as the result of diseases. Cases are also recorded in which the entire length of the hair appears striped.† Green and blue tints of the hair are produced only by colouring matters acting from without. In the change to grey, *Pinkus* states that the pigmentary alteration commences in the part of the hair most recently formed, in rare cases without change of pigment, but from the accumulation of air in the tissue of the hair. The hair-follicle having once produced a grey hair, usually continues to form grey hair as the result of the typical change of hairs. It exceptionally happens that a coloured hair is produced after the growth of white ones has lasted for months, and when such a change of the nutritive conditions has taken place, it may be repeated in the same hair.

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* *Pfaff* (Ueber das menschliche Haar, Leipzig, 1866) explains the sudden blanching of the hair somewhat differently. He instituted the following experiments:—1. By passing a current of chlorine gas through a fine glass tube on to a hair placed under the microscope. 2. By adding drops of a solution of chlorine to a hair distinctly medullated. The deeper the gas and the fluid penetrated, the more marked was the discoloration of the hair, which was finally quite blanched. From this action of chlorine the author assumes that during violent emotion an acrid fluid (perhaps a fatty acid?) is secreted by the skin and hair; he also states that during violent emotion different odours are evolved by the skin and hair (?); thus the sweat secreted under these conditions, produces greater irritation of the ocular conjunctiva than a solution of nitrate of silver; acrid secretion may, therefore, produce blanching of the hair.

Pollischek records a case of a soldier, who went to the battle of Königgrätz with black hair, but returned from it with hoary locks.

† *Wilson* observed in a boy, æt. 7, the hair striped alternately brown and white.

The cause of the sudden change of the hair to grey has not yet been ascertained. According to *Landois*, the hair is permeated by air-bubbles, but how this takes place is obscure; at least I could not observe (notwithstanding accurate microscopic investigation) either the presence of air, or change of colour in black hairs, subjected for several months to the action of an air-pump (30 atmospheres); nor could I discover any change of colour in the bristles of the hedgehog, into the cavities of which I forced air. Besides, we find that the medulla of the hairs of some animals (especially rabbits) is occupied partly with cells and partly with air, and still the hair is uniform in colour.

Treatment. Although the process of hair dyeing belongs to the province of cosmetics, we may here describe some of the methods adopted. The agent most used for this purpose is a concentrated solution of caustic potash. In the usual method of dyeing, only the epithelial layer of the hair is coloured; if the solution, however, be frequently applied and the hair immediately exposed to the sun's light, the cortical substance is also tinted. The *Henna* (an oriental dye,) is an excellent vegetable colouring agent for the hair; when combined with indigo, it imparts various tints, as red, flaxen, brown, and black. Hair-dyes are also prepared from extract of walnut-shells, lead, iron, and tannic acid.

In the case of fair hair turning grey, *Pfaff* recommends the internal administration of sulphur, and the inunction of "*Eieröl,*" which, as is well-known, contains sulphur and iron. For premature blanching of brown hair, he prescribes iron and the following pomade externally:—*Ol. ovorum rec. press., med. Oss. bov. aa* ℥j. *ferr. lact* ʒss. *Ol. Cassiæ æther* ℈j. *Eble* recommends the use of acetate of iron in combination with sulphur, once or twice a week.

4. ATROPHY OF THE HAIR (*Baldness*).

The loss of the hair (Atrichia v. alopecia adnata) may be partial or general, the baldness being either permanent or temporary, *i.e.*, a fresh growth takes place between the first and second year of life. The loss of the hair is frequently associated with that of the teeth. Bald patches may appear on parts which are usually provided with hairs, or thin and imperfectly developed hairs are produced (Oligotrichia). In the lower animals similar conditions are sometimes observed, as notably in a race of horses in the interior of Thibet, the skin of which is destitute of hair-follicles and hairs; also in a race of African dogs, and in the African pig.

The acquired loss of hair (*Calvities, alopecia senilis*) occurs mostly as a senile change, but is also observed in youth (*Calvities præmatura*). The loss of the hairs commences first on the vertex and temples, whilst the hair at the back of the head and that of the beard may remain. The hair usually turns grey before falling out. It is stated by many (*Kölliker*) that the loss of the hair in old age is due to obliteration of the capillary vessels of the hair-follicles, and to atrophy of the cerebro-spinal and vasomotor nerves, resembling that of the papillary vessels preceding the destruction of the membrane (*Henle*).

According to *Bichat*, atrophy of the hair-follicles occurs in old people, whilst *E. H. Weber* and *Simon* maintain that these structures only become smaller and contain lanugo hairs. I have frequently examined the senile scalp, and have found both hair-follicle and root-sheath shrivelled; there is at first increased cell-growth in the outer root-sheath, which is less marked at a later stage; or fatty degeneration of the cells takes place around a lanugo hair, the root of which is extremely thin and pigmented; the sebaceous glands, however, are considerably enlarged, and more deeply seated than the base of the hair follicle. *Pinkus* (Virch. Arch. Bd. 43), whose important researches on the loss of hair are frequently referred to in this chapter, found in all cases a change in the thickness of the deeper layer of the cutis, broad fibrous filaments and increased deposit of fat around the hair-follicles.

Calvities præmatura (loss of hair in youth) is not usually preceded by an alteration in the colour of the hair; the condition is hereditary. The loss of hair is accompanied by increased formation of scales, and usually commences on the vertex; on the bald parts the cutis becomes thin and stretched, whilst on the other portions of the scalp the growth of hair may be normal.

Defluvium capillorum designates the loss of hair resulting from internal disease, as after typhus and acute exanthemata; or from dyscrasic affections, as syphilis; or, lastly, as the result of general nutritive disturbance. The influence of the latter condition on the growth of hair has been shown by several experiments. *Magendie*, for instance, fed a dog exclusively with cheese, and although the animal remained healthy the hair was completely shed, probably from the food being deficient in the elements necessary to the formation of hair.

Alopecia is the loss of hair from local causes (diseases of the hair-follicles, as acne, sycosis), parasites (favus, herpes tonsurans), seborrhœa, diseases of the nerves, and derangement of nutrition. Under these conditions, the hairs themselves undergo various changes; they are deficient in pigment, thin, and fibrillated in the shaft and at the point.

In treating of acne and sycosis, we have described the papules and pustules which are produced by inflammation of the hair-follicles; in these conditions a fresh growth of hairs usually takes place, except in those cases in which the hair-follicles have been destroyed by the infiltration.

Various terms were employed by the ancients to designate the different modes in which the loss of hair occurs:—

Madesis or *maderosis* designates temporary loss of hair, followed by a rapid growth of lanugo.

Phalacrosis, when the loss of hair commences on the vertex of the head.

Ophiasis, the loss of hair extending from the occiput towards the ears.

Opisthophalacrosis, baldness at the occiput.

Hemiphalacrosis, baldness on one side.

Anaphalacrosis, baldness extending from the forehead towards the vertex.

In herpes tonsurans the hairs break off, but grow again as soon as the fungi are destroyed. In favus the hair loses its lustre, becomes brittle and fibrous, as well at the point, as at the root (resembling a pencil brush); the fibres become separated by the growing fungi, and finally the hair falls out; fresh growth takes place only in cases in which the hair-papilla is left. If, however, the favus masses be very abundant, the papillæ are destroyed after some time, and there is permanent baldness. In treating of parasites we shall revert to the subject.

As the result of lupus erythematodes on parts provided with hair, there is permanent baldness. After eczema and seborrhœa there is a fresh growth of hair. The loss of hair from syphilis is associated either with local seborrhœa (the scalp in such cases being covered by dirty-yellow, sebaceous crusts, which, on removal, display on their under surface, numerous plug-shaped masses of sebum, which have occluded the excretory ducts of the hair-follicles), or the hair is lost as the result of syphilitic dyscrasia. The absence of cilia and eye-brows in congenital syphilis is probably due to syphilitic seborrhœa (intra-uterine) affecting the Meibomian-follicles.

The so-called *pityriasis amianthacea*, or *asbestina*, which is associated with the formation of scales on parts provided with hair, is another variety of seborrhœa resulting in baldness.

Pinkus (Virchow's Arch. B. 44) has fully described this variety of alopecia. He distinguishes "pointed hair," *i.e.*, hairs which show no trace of having been cut, their greatest length being 2''. There is a typical limited growth on the margins (Randstreifen) of the scalp; the growth is slower and the hairs last only from four to nine months; whilst those which have been cut, and the long hairs of women, last from two to four years. The proportion of the "pointed hairs" to the others is constant, and that of the daily loss as 1·17, 1·15, 1·9, etc.

Between the ages of 18 and 26, when the first stage of alopecia usually occurs, the minimum of the normal loss of hair varies between 13 and 70, the maximum between 62 and 203, the mean between 38 and 108. The quantitative proportion of the "pointed hairs" to the aggregate loss, is later considerably increased; nevertheless, the absolute daily loss of hairs does not remarkably exceed the normal quantity.

This stage of alopecia is characterised by gradual decrease in the length of the hairs, and each fresh growth lasts a shorter time than the preceding one. The condition lasts from 2 to 7 years, commences shortly after puberty, extends rapidly, diminishes about the twenty-fifth year; and the later the shedding commences, the less is also the daily loss of hair. Even if this stage does not produce baldness, the hair lasts a shorter time. In order to see whether the loss of hair is pathological or not, the hairs, falling out as the result of combing, must be counted at least during four successive days, and the proportion of the "pointed hair" to the "shorn hair" ascertained: a proportion of "pointed hair," as 1·8 by an average length of 5'', in the hairs of the head is abnormal. As the first stage of alopecia is characterised by decrease in the length of the hair, the second stage is characterised by decrease of thickness. The thickness of human hairs, growing in a circle, usually varies but little, perhaps in proportion as 5·4; the changes may be distinctly observed, especially in the hairs of the fingers, the length of which is from 2 to 9''', and their typical duration from 3 to 9 months. The length of the hair and its duration are in proportion to its thickness; it lasts from 7 to 9 months. The scantier the growth, the thinner are the individual hairs, so that finally there is only lanugo. On the scalp especially, the thickness of the hair decreases most rapidly, *i e.*, chiefly within an area from 1 to 1½''' broad, commencing ¾''' from the anterior margin of the hairy scalp and extending over the vertex, the anterior border of the hair-growth, especially in the vicinity of the middle line, lasts the longest. *Pinkus* counted the hairs lost during eight days, and found that the healthy side of the head lost 108, the affected part 227 hairs, although the latter was only half as large as the healthy part. The proportion of the "pointed hair" to the "shorn hair" was on the healthy part 1·4, on the affected part 1·1.

Loss of hair from diseases of the nerves. Voigt has demonstrated that the loss of hair in old age takes place in a certain anatomical order, and is accurately limited to definite areas in the distribution of certain cutaneous nerves. By section of the ischiatic nerve in the rabbit, he found that the hair had not grown on the part (supplied by that nerve) four months after the operation, whilst on the healthy part the growth was normal (*Steinrück*, de nervorum regeneratione, Berlin, 1838). *Romberg* observed that in facial paralysis the hair was shed at the affected part; a case is also described (*Ravaton*) in which, after concussion, amaurosis of one eye occurred simultaneously with the loss of hair of the head, eye-brows, and lashes (*Simon*). Long-continued mental exertion and anxiety also produce baldness.

Alopecia areata (Area Celsi. s. Alopecia circumscripta, *Fuchs*, s. Porrigo decalvans, *Willan*, s. Alopecia occidentalis, *Wilson*, s. Vitiligo capitis, *Cazenave*, s. Phytoalopecia, *Gruby*). This affection (regarded as *parasitic* by some authors) is characterised by the occurrence of circular bald patches, which are white and glistening, the adjacent parts of the hairy scalp, presenting a scaly aspect, the hairs being readily extracted. In some cases the baldness involves the entire scalp, as well as the eye-brows, axillary, and pubic regions. The hairs are dry, deficient in pigment, and split at the point. At a later stage, a fresh growth takes place, the first hairs being devoid of pigment (lanugo); after one or two years, stronger growth is usually produced. *Gruby* first noticed the existence of a fungus in this affection, which was said to cover the hair. *Küchenmeister*, *Malmsten*, *Robin*, *Wedl*, *Bazin*, and *Hebra* also class this form of alopecia amongst the parasitic affections. I have had under my care about twenty cases of this disease, and although I carefully examined the hair, I could never discover any fungi, and must therefore pronounce, with *Cazenave*, *Devergie*, *Baerensprung*, *Hutchinson*, *Veiel*, and *Bœck*; for the non-parasitic nature of this affection.

This form of Alopecia occurs chiefly in young, ill-nourished subjects; the baldness appears in circular patches, but the skin presents no further variations as regards its thickness and sensibility.

Rindfleisch (Arch. für Derm. 4 Heft. 1869) believes he has discovered the anatomical, therapeutical, and even etiological explanation of this affection. He states that in all the hairs which are pulled out, the root is wanting; this separation of the hair from its root is produced by minute fat granules, which existed in the extracted hair. The root-sheaths are pulled out along with the hair, *i.e.*, from the sebaceous gland to the root; the hair is closely adherent to its root-sheath at the limits of the first and second third of the hair-follicle (from the fundus to the aperture of the sebaceous gland). *Rindfleisch* finds here also the fat granules. From the papilla, however, only young cells are separated, which (as the hair is separated from the root) accumulate and present bulgings between the root and the narrow hair-follicle. *Rindfleisch* believes the cure to be effected by tincture of capsicum and glycerine; I have tried this remedy in one case, but without good results.

This form of the disease, which is characterised by sharply defined circular bald patches (from the size of a lentil to that of a sixpence), is to be distinguished from the *alopecia circumscripta s. orbicularis* of Fuchs. In the latter disease, the baldness resembles that of alopecia areata, but the affected skin is depressed, atrophied, and its sensibility so much impaired that puncture with a needle is felt only when it penetrates to the deeper part of the skin. The prognosis is, in this form, absolutely unfavorable, as the baldness is permanent.

Spiess describes a peculiar form of alopecia which is characterised by atrophy of the hairs; the bulb being first involved, the nutrition of the entire structure is impaired; at the same time the parts adjoining the bulb are changed; air spaces are formed in the deeper structures, and the hair itself being permeated by air, becomes thin. If at this time the root be atrophied, the hair may fall out without breaking; or if the bulb be still existent, the hair breaks off only at those distended portions which no longer resist the pressure of the enclosed air.

We may here notice another change in the hair-shaft, viz., in the hairs of the upper lip and axillæ, two, three, or more dilatations (known by their lighter colour and distinct limitation) are observed around the base of the hair, which is readily bent at these points, and when pulled out appears disintegrated. On microscopic examination of these hairs, I frequently found a fibrillated condition of the cortical substance without further alteration. In one case only, to which my attention was directed by one of my pupils (*D. Puller*), I observed psorosperms—similar structures to those which *Lindemann* found in the hairs of a girl, who had suffered for a long time from severe headache, the same which *Lebert* had once seen in the hair of a patient affected with favus, and which appeared also in the liver, etc. The nature of these structures is still obscure, although some regard them as a further development of the gregarinidæ.

Beigel also describes club-shaped dilatations (Auftreibungen) produced by the air within the hair. These appear to me to be the result of defective nutrition of the hair-shaft, and the accuracy of this view is confirmed by the fact that I have frequently observed similar dilatations in affections of the hair-follicle (*sycosis*); they may also be produced, however, by external causes, which induce rapid desiccation of the cortical substance; in the axilla, they may frequently result from the profuse secretion of sweat and its fatty acid.

Lastly, there are adventitious causes which produce baldness. The loss of the hair is wrongly attributed to the abuse of mercurial preparations: in these cases it is due partly to the syphilitic dyscrasia, partly to local seborrhœa. Vapors of lead and arsenic, abuse of spirituous liquors, profuse perspiration, too warm covering the head (*Pfaff*) also induce baldness.

Prognosis. As the loss of hair is due to so many causes, our prognosis must vary in different cases. It is favorable in those cases comprised under the term *defluvium capillorum* (*e.g.* baldness after typhus and erysipelas), as also in the varieties of alopecia, which are produced by eczema, seborrhœa, parasitic growth, and even in those dependent upon diseases of the nerves (*Area Celsi*). In regard to the prognosis of alopecia, *Pinkus* has contributed important data. In all cases it is well to examine the hairs microscopically (both those which have fallen out, and those at the margin of the bald part) in order to ascertain the thickness of the root and shaft, as well as the condition of the cortical substance.

Treatment. In this, as in all diseases in which treatment is least efficacious, there is a host of vaunted specifics, some of which doubtless have been useful. The remedies employed in favus, herpes tonsurans, and eczema, are also serviceable in alopecia. In cases in which the loss of hair is due to increased secretion of sebum, the treatment is directed towards the removal of the crusts or scales, and consists in frictions with *spirit. vini gallici*, ointments of white precipitate, or zinc and lead *(aa.* 1 *dr. ad.* 1 *oz.*), or in rain douches. In debilitated subjects, the growth of the hair will be favored by liberal diet along with preparations of iron and quinine. On such measures I should place most dependence, but I may here record the experience of *Pfaff* and *Pinkus* in regard to the treatment of alopecia.

In cases in which the root is found on microscopic examination to be deficient in pigment, *Pfaff* prescribes daily inunction with fat, marrow, or *ol. pedum tauri,* in combination with Peruvian balsam, and internally preparations of iron. In some instances we observe wart-like dilatations (of the epithelial layer) in the hairs which have been recently shed; this condition is produced by the secretion of acrid perspiration, which is injurious to the hair (?). In such cases the treatment consists in preventing the profuse perspiration (by perforated hats, etc.), and in washing the scalp frequently with water, sage, or China decoction.

Pinkus instituted important experiments on the hairs of the fingers with the following agents:—

1. *Tinct. Fowleri* ʒj, *Aq. dest.* ℥iij. As the result of frictions with this solution, continued during six months, the hairs, the points of which formerly had

been broken off, were restored to their normal condition. 2. *Tinct. Hellebor. alb.* ʒj, *Tinct. Benzoin* ℥j, *Tinct. myrrhæ* ʒiij, *Spirit. rectf.* ℥vj, afforded similar results. 3. *Acid hydrochlor.* ʒj, *Aq. dest.* ℥j. 4. *Veratrin* gr.j, *Spirit. rect.* ℥j, 5. *Tinct. Hellebor.* 6. *Tinct. cantharid* ʒj, *Spirit. rect.* ℥j; the hairs sometimes break off as the result of friction with this solution, but afterwards become normal. 7. *Ol. Sabin.* gtt. xv., *Spirit. rect.* ℥j. 8. *Sodæ carbon* ʒij, *Adip.* ʒj. 9. *Solution of common salt.* 10. *Coniin.* gtt. III, *Spirit rect.* ℥ss. 11. *Tinct. secal. cornut. Arsenic, Veratrin, Cantharidin,* and *Sabina,* are absorbed by the hairs, and render them brittle; this results especially from *Ol. Sabinæ.* The rapidity of the growth becomes diminished, the typical duration prolonged; it is applied in the form of ointments, or as watery solution. 12. *Tannin* as *Tannin oil,*: *Tannin* gr. x, *Alcohol* gr. x, *Ol. amygdal* ℥j; or, *Tannin* ℈iv, *Ungl.* ℥j. When this remedy is applied the head must be cleansed twice a week. The application of *Ol. Sabin,* 5-30 drops to one ounce of *alcohol,* is attended with good results, but the hair loses its softness, and the colour becomes somewhat grey or brown; as the odour is disagreeable, *Ol. cinamon.* may be added. *Sodæ bicarbon* is an excellent remedy (?), but the hairs become somewhat reddish brown. The solutions are rubbed in (painted) or applied in compresses, and the scalp covered with an oil silk cap.

CLASS VI.

NEW FORMATIONS.

A. *Diffuse.*

1. LUPUS (*Wolf, fressende Flechte, Herpes esthiomenos*).

There are two forms of this disease, distinguished as: 1. *Lupus vulgaris seu Willani;* 2. *Lupus erythematodes seu Cazenavi.*

a. Lupus Vulgaris.

This term is applied to a cell infiltration of the cutis, which is not productive of new tissue, and after a variable time, induces fatty and molecular degeneration, as well as ulceration and shrivelling of the cutaneous structures.

Lupus vulgaris occurs:—

a. In the form of brownish-red maculæ, varying in size from that of a pin's head to that of a lentil (*lupus maculosus*).

b. In the form of brownish-red papules or nodules (varying in size from that of a pea to that of a hazel nut) and projecting from the skin (*L. tuberculosus, nodosus*).

c. In the form of infiltrations, the skin being brownish red and covered with epidermic lamellæ (*L. exfoliativus*).

d. In the form of atonic ulcers, which are produced by softening of the infiltration (*L. exulcerans*).

e. In the form of new growths, which project above the surface of the skin and frequently occupy extensive areas (*L. hypertrophicus*).

f. In the form of excavated ulcers, extending from the periphery (*L. serpiginosus*).

As we shall see, in considering the anatomy of this affection, these varieties of lupus are only different stages of one and the same morbid process, *L. maculosus* being the first, and the others later stages; *i.e.*, the macula by increase of the cell-infiltration becomes a papule or nodule, which undergoes ulceration.

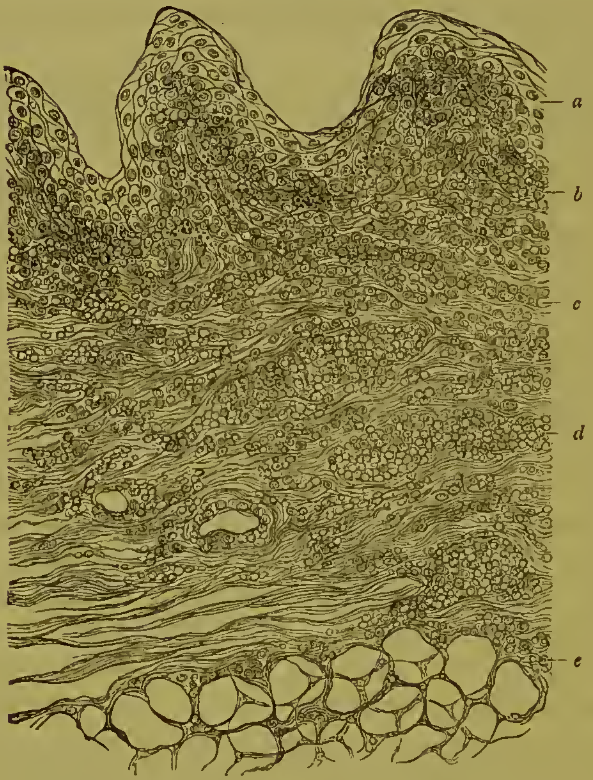
L. vulgaris most frequently attacks the face, external ear, nose, cheeks, buttocks, and extremities, and rarely the trunk. The cartilages, ligaments, and mucous membranes are also the favorite seats of this affection, especially the mucous membranes of the lips, hard palate, œsophagus and larynx.

Anatomy. In addition to the excellent descriptions of this disease by *Willan, Biett, Cazenave, Schedl,* and especially *Hebra,* (authors, however, who regard more the external form than the nature of the disease) accurate anatomical researches have been recorded by *Wedl, Berger, Pohl, Auspitz, Rindfleisch,* and others.

The histological condition varies according to the stage of the morbid process, the essential change being cell-infiltration throughout the corium. There is no doubt that the morbid process in *lupus vulgaris* originates in the corium, and not in the sebaceous glands (Adenoma of *Rindfleisch*); whilst in *L. erythematodes* the latter structures are often primarily attacked. In *lupus maculosus, tuberculosus,* etc., the cell-growth extends towards the surface; if the morbid process is deeper, hypertrophy of the tissue elements supervenes. In general the changes are as follows:—the cells of the rete Malpighii display granular contents (fat or pigment granules), the corium is succulent and extended, the papillæ but slightly elongated, rather dilated, the meshes being wider than in the normal skin. In these is observed a net-work of fine connective-tissue fibres (see *Auspitz,* med. Jahrbücher, 1864). The corium is occupied by groups of roundish and oval cells. The subcutaneous connective tissue is denser, and the fat cells occur sparingly, or are entirely absent. The sudoriparous glands are unaltered, blood and lymphatic vessels distended; the sebaceous glands occur but sparingly. The papillæ are lengthened and widened, at some parts normal. Similar infiltrations are observed in the subcutaneous cellular tissue.

Etiology. Syphilis and struma are regarded by many authors as the sole causes of lupus. As regards the first, experience shows the dissimilarity of the two diseases, for the parents of children affected with lupus, are usually healthy. The course and the result of treatment do not favour such a view; for the course of the lupus efflorescence is slower than that of syphilis, and in the former anti-syphilitic remedies are useless. As regards struma, it cannot be denied that many forms of lupus are directly associated with

Fig. 35.



Section of a lupus nodule from the cheek. *a.* Rete Malpighii. *b.* Cell infiltration in the papillæ. *c. d.* Cell aggregation in the superficial and deeper layers of the cutis. *e.* Cell infiltration in the panniculus adiposus.

enlargement of glands, caries, and necrosis, especially in the case of children. Nodules and lupus spots are frequently observed around strumous ulcers which are healed; anti-strumous treatment frequently suffices for the cure of such forms of lupus. In many cases, however, the persons affected with lupus appear in every other respect strong and healthy.

Diagnosis. In most cases the above description will suffice for the diagnosis of the disease; sometimes, however, *L. vulgaris* may be confounded with: 1. *L. erythematodes,* 2. *Syphilis,* 3. *Eczema,* 4. *Psoriasis.* In treating of *L. erythematodes,* we shall mention the distinguishing characters. The distinction between *syphilis* and *L. exulcerans* and *tuberculosus* is often difficult; the following indications, however, will facilitate the diagnosis:—syhilitic nodules are hard, develop rapidly, are never isolated, and are usually associated with other forms of eruption; whilst those of lupus are usually softer, develop very slowly, and are limited to certain parts of the skin, as the nose and cheeks. The course of syphilitic ulceration also is more rapid than that of lupus. In the case of syphilis, other structures are more frequently involved, as the mucous membranes of the nose and mouth, tonsils, and uvula, also the bones of the nares and palate. *L. exfoliativus* is distinguished from *E. squamosum* by its slow progress; the infiltration is always deeper in lupus than in eczema; as the result of lupus, cicatrices are formed, but never in eczema; in the periphery of lupus patches, brownish-red macules or papules are frequently seen, which render the diagnosis still more certain. *Lupus* and *psoriasis vulgaris* can scarcely be confounded, as the scaly masses in lupus exfoliativus are scanty, and on their removal an infiltrated corium (which does not readily bleed) is exposed; further, lupus is usually limited to a smaller area, whilst psoriasis is widely distributed.

Lupus tuberculosus resembles *acne rosacea,* but the latter is recognised by the character of the nodules, the existence of comedones and acne pustules, and by the dilated veins.

Epithelial carcinoma will not be confounded with lupus if we observe the hard cartilaginous borders, the irregular surface of the ulcer, and the deep, rapidly-extending ulceration in the former disease.

Prognosis and *course.* Lupus may occur in children above three years of age, and frequently appears in the form of scattered, brownish-red spots, which easily remain unnoticed; the affection frequently occurs on the extensor surfaces of the elbow and knee-joints, and on the back of the hand, in the form of flat scaly nodules (from the size of a pea to that of a sixpence), which are produced by the confluence of smaller papules; these patches often disappear spontaneously, leaving a brownish-red and furrowed cicatrix; in many cases, however, the disease becomes further developed, and affects the entire limb or trunk. This extension of the morbid process occupies several years, and its progress is most rapid about the age of puberty. As the separate spots and nodules heal, new ones are formed at the periphery of the patch, which ulcerate, so that the central cicatrix is surrounded by serpiginous ulcers. Lupus often attacks the nose and cheeks, which, in many cases, are destroyed, the nose being drawn upwards by the cicatrix, and the face disfigured by the loss of the alæ and septum of the nose; ectropion of the eye-lids and fissures at the corners of the mouth are produced by lupus of the cheek; hoarseness and aphonia by lupus affecting the larynx, and deafness when the disease involves the external ear. The limbs become stiff, and the fingers may remain permanently in the semi-flexed position, as the result of lupoid cicatrices. Happily these sequelæ occur only when lupus has existed for years, and may be averted by treatment. Lupus endangers life only in those cases in which it is associated with epithelioma. Besides the cases of this kind recorded in literature, two have been published by *Hebra*, one of which occurred in a man forty-six years of age, who had suffered since childhood from lupus of the cheeks; epithelioma occurred at the site of the lupus, and was completely cured by the application of caustics; the other case terminated fatally.

Treatment. The internal remedies employed in lupus are iodide of potassium and cod-liver oil, or the "iodized cod-liver oil" (*Iod. pur.* gr. iij. *Ol. jecor. asell* ℥vi). The iodine, however, is uncertain in its action,—failing in some cases, and in others taking effect only after having been long continued. The cod-liver oil is chiefly useful in those cases in which the disease is due to well-marked struma. In some cases, we have seen the cure effected by the combined internal and external use of the oil. The external treatment, which we regard as more important, consists in remedies which promote absorption, and in caustics; to the former belong the *Emplast. mercuriale* and the *iodide of glycerine* (*Richter*); *Iodi puri, Potass. hydriodici aa.* ʒj, *Glycerine* ℥ij. This solution is painted on the patches of lupus three times a week, the part being afterwards covered with gutta-percha tissue, in order to insure the action of the iodine vapour on the skin: this method is attended with a considerable amount of pain. *Emplastrum mercuriale* is useful in *L. maculosus, exfoliativus,* and in *L. erythematodes*; although it may not succeed in arresting the morbid process, it ought, in any case, to be tried, especially in children and sensitive patients before resorting to caustics.

Caustics. The solid nitrate of silver is to be rubbed well into the nodules of lupus, until it meets with resistance, so as to penetrate the entire patch, and separate the lupoid growth from its base. This application is repeated twice a week: the pain lasts from three to four hours after each cauterisation. The cicatrices thus produced are usually superficial and smooth. Nitrate of silver is suitable in all forms of the disease, and is preferable to other caustics in lupus of the face.

Concentrated solutions of nitrate of silver (1 *argent. nitrat.* to 1 of water) is suitable in the superficial forms of lupoid ulceration, especially when granulation has commenced.

Caustic potash in the solid form is a very powerful agent, and its action extends beyond the parts to which it has been directly applied, as it forms a concentrated solution with the blood, pus and watery portion of the tissues, which acts as a caustic on the adjacent parts. During its application the caustic potash produces intense pain, which, however, subsides after a short time. The cicatrix formed by caustic potash is usually hard and fibrous; it is a suitable agent, therefore, only when lupus is seated on covered parts of the body, and is to be used for the face only in cases in which the nose is much involved, when we are obliged to adopt rapid measures.

Vienna Paste (consisting of equal parts of caustic potash and quick-lime diluted with alcohol) is spread on linen to the thickness of the back of a knife, and applied for ten minutes to the lupus patch, the surrounding healthy skin being protected by strips of adhesive plaster; as the result of this application an eschar is formed; and the eschar separates within a fortnight. This method, however, is suitable only when the lupus is distinctly circumscribed; *e.g.*, in patches of the size of half-a-crown. *Landolf's* paste (consisting of the chlorides of bromine, zinc, and antimony) is employed in similar conditions; during the first three days, it is changed daily. In *L. hypertrophicus* and *L. serpiginosus* simple *Cosme's paste* (*Arsenic alb.* ℈j, *Zinnabaris factitiæ* ʒj, *Ung. simpl.* ℥ij) is also applied; during three successive days, it is renewed daily. On the first day the pain is very slight; on the second, rather worse, and on the third, most intense.

The effect of this caustic is to render the lupoid growth tumified and bluish-red in colour, the adjacent parts being œdematous. The growths are usually thrown off in the form of crusts within a fortnight. On account of the arsenic contained in this caustic, it should be applied only to limited portions of the skin, in order to avoid absorption of the poison. In extensive forms of lupus, the modified *Landolf's* paste is suitable, or a paste composed of glycyrrhiza and concentrated hydrochloric acid (*Hebra*).

The chloride of zinc (*Veiel*) is also used as a caustic in lupus, *i.e.*, it is mixed with *pulv. radices althææ*, or *farina*; by *Cancoin's* method (*zinci chlor. liquor antimon, chlor. aa. part. unam. u. f. pasta.*).

The action of all these pastes, however, is slow and very painful; they should be applied during at least twenty-four hours.

Galvano-caustic. The actual cautery has been employed in the treatment of lupus, but has never come into extensive use, owing to the difficulty of regulating the action of the heat. This object has, however, been attained by the galvano-caustic; according to the requirements of particular cases, the platina may be applied in the cylindrical form (pointed or blunt), or adapted to the shape of a knife. The galvano-caustic apparatus is so constructed that the requisite degree and duration of heat can readily be obtained; and it affords the further advantage of being less painful during, and subsequent to, its application than the nitrate of silver (after the use of the nitrate, the pain lasts from four to eight hours). Patients who have been treated with various other caustics, always prefer this method. At certain parts, however, the application of the galvano-caustic is extremely painful, as, for instance, the angles of the eye and mouth, the maxillary region, the neck, and the flexor surfaces of the joints. The amount of pain depends also upon the degree of heat; it is least with the "white hot" cautery, but this is rarely applied, as the action of the heat extends (by radiation) to the adjacent parts, and the glare obscures the papules of lupus, which are often recognised only by their colour. Another important advantage of the galvano-caustic is, the rapidity of its action in destroying the affected tissues. In treating the various forms of lupus (*tubercul. hypertroph. serpiginos. etc.*), by this method (in *Hebra's* clinique) we have had sufficient evidence of its advantages. Lastly, by this means the disease is cured in a much shorter time. In most cases, the result is obtained without any other treatment; one application of the galvano-caustic is equal to about twenty of the nitrate of silver.

Galvano-caustic instruments: 1. A platinum wire loop with a point, similar to a tooth burner. 2. An ordinary porcelain cautery with numerous spirals. 3. A flat piece of platinum wire resembling a knife in shape.

Carbolic acid. This caustic is employed chiefly in the slighter forms of lupus maculosus and tuberculosus.

I use the acid (according to *Hardy's* method) in combination with alcohol in proportion of 1 : 1 : 2 : 3 : 4; the degree of concentration is modified according to the sensibility of the patient. The more concentrated the solution the more rapid is its action; the amount and duration of pain depends upon the concentration of the solution and the stage of the affection. The cicatrices produced by carbolic acid are less disfiguring than those of any other caustic. This acid also saturates the tissues, and acts by absorption on those parts to which it was not directly applied; in this respect, therefore, it resembles caustic potash, but its action does not extend so deeply, and the resulting cicatrix is much less prominent. I have found it serviceable in the circumscribed forms of lupus. The frequency of its application will depend on the degree of concentration, 1 : 1, three times a week, 1 : 3 : 4, daily.

In order to investigate its action upon the organic tissues, I selected for experiment the ears of a white rabbit; as the result of the injection of four drops of a solution of one part carbolic acid to four parts of alcohol (by a *Pravaz's* syringe), a dark-brown wheal (of the size of a lentil) limited by an œdematous wall (2-3′′′ broad) was formed; the next day it had increased to the size of a sixpence, the entire external ear being swollen, hot and reddened. After the lapse of fifteen days, a crust was shed, leaving a corresponding abrasion on the part. On microscopic examination the crust was found to be transparent (as if from the action of acetic acid) the cell-infiltration being limited to the corium; the entire crust was dry and shrivelled.

b. Lupus Erythematodes.

This term is applied to a disease, the distinctive features of which are infiltration of the corium, associated with a morbid condition of the sebaceous glands, and the formation of comedones; the ulcerative process is slow in its progress, and never extends deeply into the tissues (Lupus qui detruit en surface, *Biett*). Maculæ or papules (which are at first of a pale red tint, of the size of a pin's head) appear on the skin of the face; in the centre of each papule is the aperture of the hair-follicle, which is covered with a thin and closely adherent epidermic scale, or greenish crust. By the gradual extension of this efflorescence, patches (of the size of a sixpence), are formed, which, at a later stage, involve larger portions of the skin. When the morbid process has lasted for some time, the centre of the patch heals (sinkt ein), and the disease extends periphcrically, the margin being reddened and elevated; the efflorescence becomes confluent, and on the nose and cheeks, the patch assumes the form of a butterfly,—the body being represented by the nose,—the wings by the cheeks (*Hebra*). In the surrounding parts papules make their appearance, and passing through a similar development, the centre of the efflorescence heals, whilst the disease extends from the periphery. As the patches coalesce the points of contact disappear, and the lupus efflorescence assumes the aspect of tortuous lines. At length the disease may involve the entire skin of the face. In cases in which the affection has lasted several years, a cicatrix (of variable thickness) is formed, which is darkly pigmented, glistening and parchment-like.

The scalp is frequently attacked by erythematous lupus, as the result of which, circular bald patches occur, the apertures of the follicles being at first distended and occluded by sebaceous masses; at a later stage the follicular apparatus is destroyed, the skin becomes cicatrised; the ulcerative process may again arise in the cicatrix.

In most cases, the affection on the lips is associated with that of the external ear, the parts being covered with abundant dry scales; the trunk and extremities (especially the upper) are exceptionally involved, and very rarely the palm of the hand.

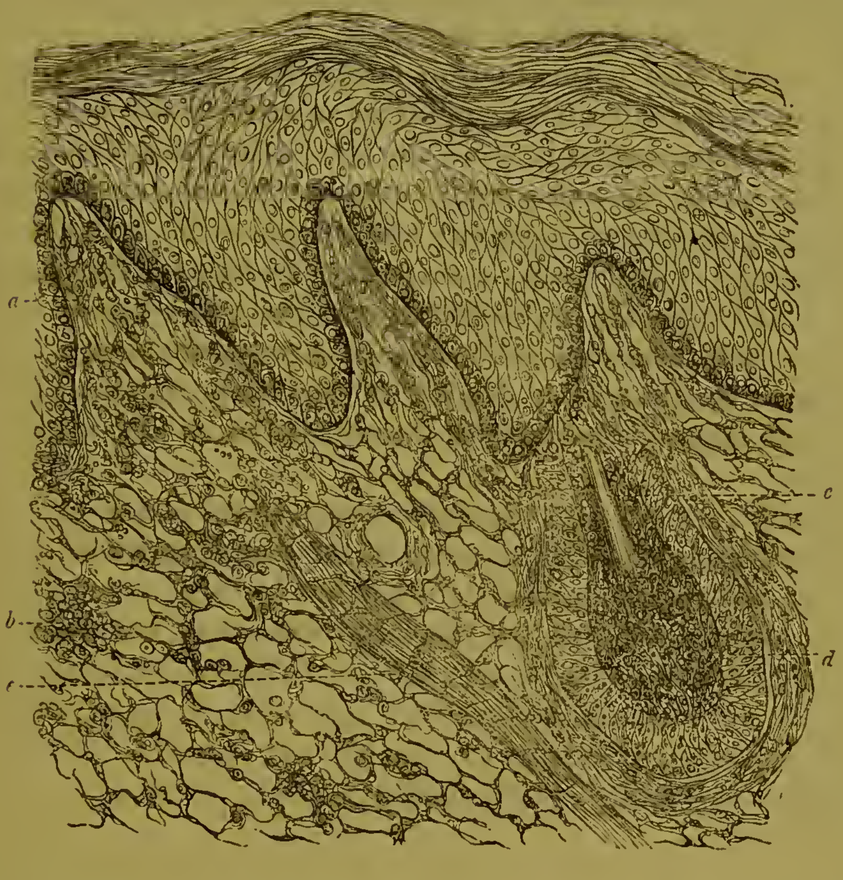
Besides causing considerable deformity of the face, and baldness on the scalp, the affection gives rise to severe itching; it runs a chronic course, and is not readily influenced by remedial measures; relapses also are frequent.

Lupus erythematodes occurs more frequently in females than in males; it is rare under the age of twenty. I have hitherto seen only two cases (one in Hebra's clinique, the other in my own) in which lupus appeared at the age of seven.

Lupus vulgaris is distinguished from L. erythematodes by the formation of nodules, ulcers, etc.; only when the latter disease affects the scalp, superficial ulceration of the cicatrix sometimes results. Erythematous lupus also is less extensive than L. vulgaris. The latter may appear during childhood, whilst the former is rare under the age of twenty. In most cases, the sebaceous glands, and hair-follicles, are readily seen to be the primary seat of the affection, the excretory ducts of which are occluded by scales and comedones, whilst in L. vulgaris, small brownish-red maculæ, constitute the primary efflorescence.

Anatomy. In the year 1863, I had an opportunity of studying the microscopic character of the disease (of which nothing had previously been known), and the results have already been published (Wiener medicinische Wochenschrift). In the case referred to, I pointed out the clinical fact that lupus erythematodes primarily attacks the cutaneous glands (sebaceous and hair-follicles), and this observation has since been confirmed by the histological researches of *Geddings* (Sitzungsb der k. Acad. 1868). At the commencement of the morbid process, the walls of the sebaceous glands are observed to be thickened by connective tissue and cells, the latter being very numerous both within and around these structures. When the disease has lasted some time, the changes become more marked; the glands lose their acinous structure, and from the occlusion of their excretory ducts, assume the globular form (with friable contents), appear near the surface of the skin, and on most parts are finally destroyed. In and round the hair-follicle, there are similar infiltrations; as the result of which the

Fig. 36.



a. Enlarged papilla with cell-infiltration. *b.* Accumulation of cells. *c.* Hair (cut). *d.* Sebaceous gland with infiltration. *e* Arrector pili.

hairs fall out, those still remaining become fibrillated at the free end, the root-sheaths being loosened, and the pigment diminished.

On the under surface of the (separated) epidermis, plug-shaped processes are seen which (as in the case of seborrhœa) occupied the excretory ducts of the follicles.

The papillæ (Fig. 36) are changed in form and size, some being elongated in a cylindrical, others in a conical form ; most of them are enlarged (from ten to twelve times their normal size) ; the stroma presents a dense net-work of connective-tissue fibres and cells, arranged in groups; in the corium the net-work is not so dense, but groups of cells are apparent.

These cells also occur in rows (zugweise) which traverse the tissues in various directions, appearing so superficially as to obscure the line of demarcation between the rete Malpighii and the corium. At other parts the cell-growth extends into the deeper layers, forming aggregations (plaques) which replace the normal tissues. At this stage of the morbid process, the two forms of lupus *(erythematodes* and *vulgaris)*, are indistinguishable in histological appearances; in both cases, the cells undergo retrograde changes, and at some parts we observe a deposit of yellowish granular pigment. When the disease is protracted, the adipose tissue and nerves also disappear.

Another case of erythematous lupus came under my notice, which was exceptional, in as much as the disease involved not only the face, but also the palms of the hands. As there are no sebaceous glands, or hair-follicles, on the latter situation, the microscopic examination sufficed to show that the affection does not always originate in these structures. In this case, I found shrivelled cells,[*] aggregated chiefly at the line of junction of the rete Malpighii and cutis, but extending also into the deeper layers of the skin.

Treatment. As only the local changes are known, whilst the causes of this affection remain obscure, our treatment is limited to the destruction of the morbid products, by such agents as the *Spiritus saponis alkalinus;* the part having been rubbed with flannel, or a rough towel, the *white precipitate ointment* (ʒj ad ℥j) is applied ; the addition of *bismuth* increases the efficacy of the remedy. Potash cream, caustic potash, and corrosive sublimate (concentrated) have a similar action. The solution of caustic potash is applied every third day. In obstinate cases, the concentrated acids (acetic, nitric, chromic, or carbolic), may be employed. Strong nitric acid acts rapidly as a caustic, but is unsuitable in many cases, as the eschar thus produced long remains adherent. In one case, I applied carbolic acid with good results; it is superior to the mercurial plaster. The iodide of glycerine also, is sometimes useful. The inunction of *Unguent Rochardi.* (*Calomel* gr. xx., *Iod. par.* gr. vii., *Leni igni fus. adde. Ungt. simple* ʒij), is attended with good results. *Wilson* recommends the internal use of cod-liver oil, arsenic, and iron; and externally, sulphur baths, liquor. hydrarg., citric acid, and iodide of sulphur ointment.

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[*] These cells showed only slight absorption of carmine, and were not rendered more distinct by the action of acetic acid.

2. SYPHILIS OF THE SKIN.

The non-syphilitic skin affections are so closely allied to those of syphilitic origin, that our knowledge of the former would be incomplete without a description of the phenomena of syphilis, as presented by the skin. The infecting principle of chancre was regarded as identical with that of syphilis, at a time when the distinction between venereal and non-venereal affections was but imperfectly understood. *Hunter* (1767) accepted the views of *Fernel, Fallopia, Astruc* and others, with regard to the identity of the chancre and venereal poison, (Tripper contagion), although *Sir Charles Bell's* experiments led to quite other results, and he was the first to notice the relation between the indurated chancre and general syphilis. As the result of his experiments on the inoculation of syphilis, *Hunter* demonstrated the indurated chancre as the primary effect of the poison, and the sole cause of the general symptoms.

Ricord proved clearly that the gonorrhœal poison is merely local in its effects, and essentially distinct from that of chancre, as the discharge of the syphilitic sore, being absorbed by the adjoining lymphatics, causes suppuration in the glands (primary syphilis), and thus the process terminates with the exhaustion of the poison. When the primary sore is hard (indurated) at the base, the infection of the system is shewn by morbid changes in the skin, mucous-membranes and bones (*secondary* and *tertiary syphilis*). *Ricord*, at first, regarded secondary syphilis as non-contagious. In Germany, however, *Waller's* interesting experiments (1850) demonstrated that syphilis may be transmitted by blood, mucus and other secretions to healthy subjects without being necessarily preceded by a chancre at the point of inoculation; the poison may be inoculated sucessfully by any of the secretions. By comparing the chancre produced by inoculation, with the original sore, *Clerk* and *Bassereau* (1852) have demonstrated two varieties of chancre—the *hard sore,* which is the result of blood infection, and the *soft sore,* from local infection, the effects of which are limited to the part. Hence the duality theory of the syphilitic poison, which has since been adopted by *Ricord.*

Clerk has stated that the so-called soft sore is due to the contagion of hard chancre, in patients already affected with syphilis. The soft sore thus produced is termed *chancroid,* and may be transmitted by inoculation, (indefinitely), without returning to its original character (induration). These observations, however, have not been confirmed by *Ricord.*

Further research and experience have established the two varieties of chancre, one of which is local, acute in its course, and only exceptionally followed by constitutional symptoms (soft sore), the other characterised by its hard base, chronic course, and constant sequelæ of constitutional syphilis (indurated sore). This duality theory has been advocated in Germany by *Bärensprung, Zeissl,* and others.

The results of experiment have shown that the hard chancre cannot be produced a second time by inoculation, whilst the soft sore may be repeated indefinitely by this process,* and further that the more numerous the local sores, the less will be the probability of general symptoms. As a further distinctive character, it was found that the secretion of the soft chancre can be transmitted to the lower animals *(Auzias),* but not that of the hard ulcer. Experiments instituted by *Waller, Wallace, Robert, Hebra, Lindwurm, Pellizani, Zeissl,* and others,† regarding the transference of the syphilitic virus, showed that after the lapse of several weeks induration of the inoculated part always occurred.

Rollet, of Lyons, has described a third variety, the *mixed chancre* (chanker mixte mulet.) As experience has shewn, sores which at first present all the characters of soft chancre, may, after a few days, become perfectly hard at the base; but the duality theory was supported by the apparent accuracy of *Rollet's* propositions.

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* In the year 1863, *Boeck,* of Christiania, questioned the accuracy of this observation, and ascribed the failure of syphilisation at our school, not to the method itself, but to the fact that we inoculated from the soft, instead of the hard sore.

† See *Auspitz* (Die Lehren vom syphil. Contagium. Wien, Braumüller, 1866).

In these cases, according to *Rollet*, the individual had been subjected to the simultaneous action of the two poisons, one of which has only a short period of incubation, appearing as a pustule, or ulcer, on the third day; the other has a longer stage of incubation, and the hard base appears, therefore, only after a week, or still later. From this hypothesis, the duality doctrine derived considerable support. Vaccination was said to be analogous to this process; *e.g.*, if healthy subjects be vaccinated with lymph (taken from syphilitic subjects) without admixture of blood, pus, etc., a normal vesicle results; if however the vaccine lymph be mixed with blood, pus, etc., there is distinct induration after the formation of the pustule.

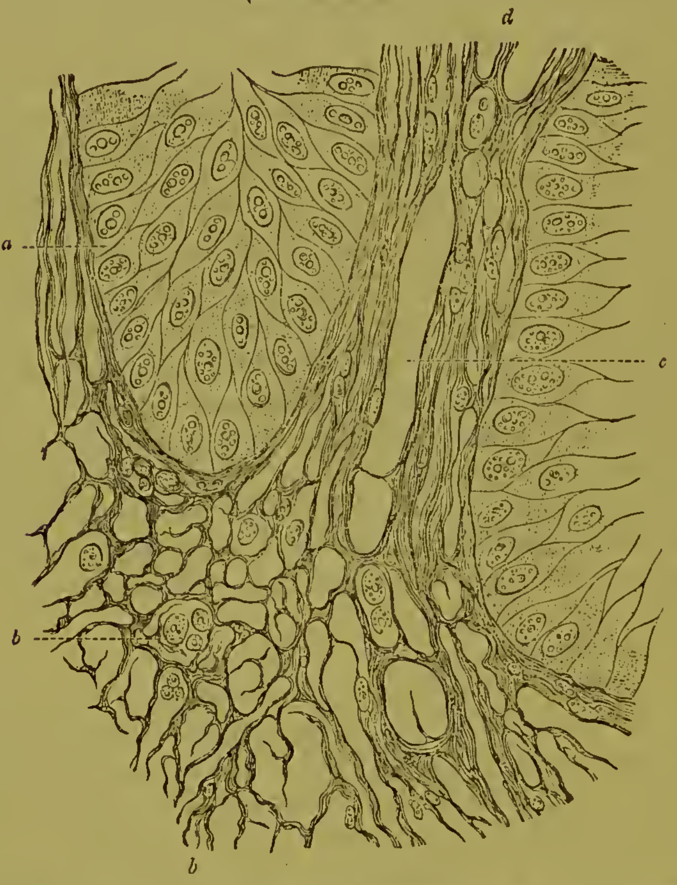
These observations, which seemed to confirm the duality doctrine, have however been rendered doubtful by the accurate experiments of modern times. *Vidal* (1853), emphatically pronounced for the unity doctrine of chancre, *Langlebert*, and others, soon adopted this theory (1858). In Germany, *Hebra*, *Sigmund*, and *Michaelis*, also accepted this view, whilst others were, for a time, attracted by *Rollet's* ingenious hypothesis. The repeated experiments of *Bidenkap*, *Köbner*, and others, have proved that only the secretion of hard chancre, or of condylomata, etc., is inoculable in the syphilitic subject. In order to obviate the objection that the experiments which we have just described, had been made with the pus, taken from ulceration of chancrous cicatrices, *Reder* reopened the chancre, by introducing a seton, and inoculated the same individual, but without success. From the experiments of *Reder* and *Krause*, it would appear that only the fresh pustules are inoculable; in syphilitic subjects, pustules are produced by the inoculation of pus, which in the healthy skin is unattended with such results.

The most important argument for the duality doctrine is therefore refuted, and chancre can no longer be regarded as independent of syphilis. The pus of the soft chancre is a concentrated poison, which, being rapidly destructive in its local effects, prevents general infection, whilst the secretion of the hard sore produces gradual and chronic blood-poisoning. The soft chancre is usually a local affection, and when inoculated into healthy subjects, produces sores of a similar character; general syphilis is very rare as the result of this form of chancre. The soft and hard sores present no marked anatomical differences: cell infiltration, and morbid changes in the walls of the blood-vessels, are common to both, and in the soft chancre the phenomena of ordinary dermatitis are superadded, *i.e.*, the blood-vessels are distended, and (according to *Lindwurm*) the connective tissue, and Malpighian cells are enlarged (Fig. 37).

The hard sore presents induration similar to that of the so-called secondary nodules; as to the mode in which the induration is produced, opinions are divided, the following are the views on the subject:—as a primary plastic exudation (*Bärensprung*), as the formation of dense capsules (*Michaelis*), as effusion in the lymphatic vessels, (*Ricord*), or as the result of the thickened vessels, and dense connective tissue. The definite histology of hard chancre may be thus stated:—cell infiltration of the cutis, cell proliferation, fatty change and degeneration in the rete Malpighii. In the ordinary form of induration (without ulceration), the changes are essentially similar, except that we find cicatrix-like atrophy of the cutis, which is covered by a thin epidermic layer (*Auspitz*).

Fig. 37.

(After Biesiadecki.)



Section of the parts around a soft chancre. *a.* Epithelial layers of the rete mucosum (tumified). *b.* Corium. *c.* Distended capillary vessel of papilla with attenuated wall. *d.* Papilla. The connective-tissue fibres are separated by round cells and serous fluid.

In this form of induration, *Verson* (Virchow's Arch. 45, Band) observed connective tissue and exudation cells. These cells are elongated, pointed, or spindle-shaped; also dense fibrous elements with exudation corpuscles, the adventitia of the vessels separated by cells (originating in the infiltration).

SOFT CHANCRE (*primary sore*).

The soft chancre is characterized by a red or yellowish tumified border, which is distinctly circumscribed by a soft base, and secretes yellow or greenish pus. The inoculation of this purulent secretion in the healthy skin, is succeeded on the third day by a pustule, which enlarges and bursts, presenting similar characters to those of the original chancre. These sores, the usual seat of which is the genitals, are generally associated with enlargement of the adjacent lymphatic glands; these glands frequently suppurate, and their contents are also inoculable. By the "syphilisation method" of *Boeck* for the cure of syphilis, several hundreds of these sores may be produced on the skin within a few months, by inoculation, and the capability of inoculation ceases only when a part of the skin is covered with sores (local immunity), or when the entire organism has been saturated with the syphilitic poison (temporary immunity); the latter condition lasts only a few days, during which period even the most recent secretion does not "take;" after the lapse of some time, however, inoculation is again successful.

The chancre pus differs neither in chemical nor histological character from that of other ulcers. The varieties of chancre are: the *ordinary* sore distinguished by the characters we have just described. The *phagadænic* or *gangrenous* sore, which usually occurs in subjects debilitated by scurvy, tuberculosis, or the abuse of mercury; it is attended with severe pain, the tissues are rapidly destroyed, the gangrenous part being separated from the surrounding healthy structures by a well-marked line of demarcation. The *serpiginous* sore heals in the centre, and extends from the periphery in the form of crescentic lines, assuming the kidney-shape. The *burrowing* sore (unterminirendes Geschwür) which usually extends into the subcutaneous cellular tissue in the form of hollow or fistulous tracts. The *diphtheritic* sore, the surface of which presents a closely adherent and yellowish white pellicle: it is usually associated with severe inflammation.

Local treatment of chancre. The sore, if superficial, heals spontaneously, and only requires the application of charpie. In most cases, however, caustics, such as nitrate of silver, caustic potash, corrosive sublimate, carbolic acid, or Vienna paste, are necessary. These agents are applied in the concentrated form, or in solutions (1-4 gr. *ad* ℥j). In some cases, a paste composed of charcoal, and sulphuric acid, is a suitable application. In the later stages the following agents: red precipitate (gr. j.), white precipitate (gr. x. to ʒj), *Ungt. Basiliconis, Hydrargyri protiodid, Aqua phagadænica (Hydrarg. subl. corros.* gr. j., *Aq. calc.* ℥j.*);* also a paste, (consisting of *Acid. carbol. part unam, Ol. lin. part. sex. Cret. alb. q. s. ut. f. past. mol.) Lister's dressing*, which is spread on linen and renewed daily, is especially suitable for larger ulcers. The *Emplastrum mercuriale* is also a suitable application. The treatment will of course be modified according to the seat and character of the sore, as well as the constitution and occupation of the individual.

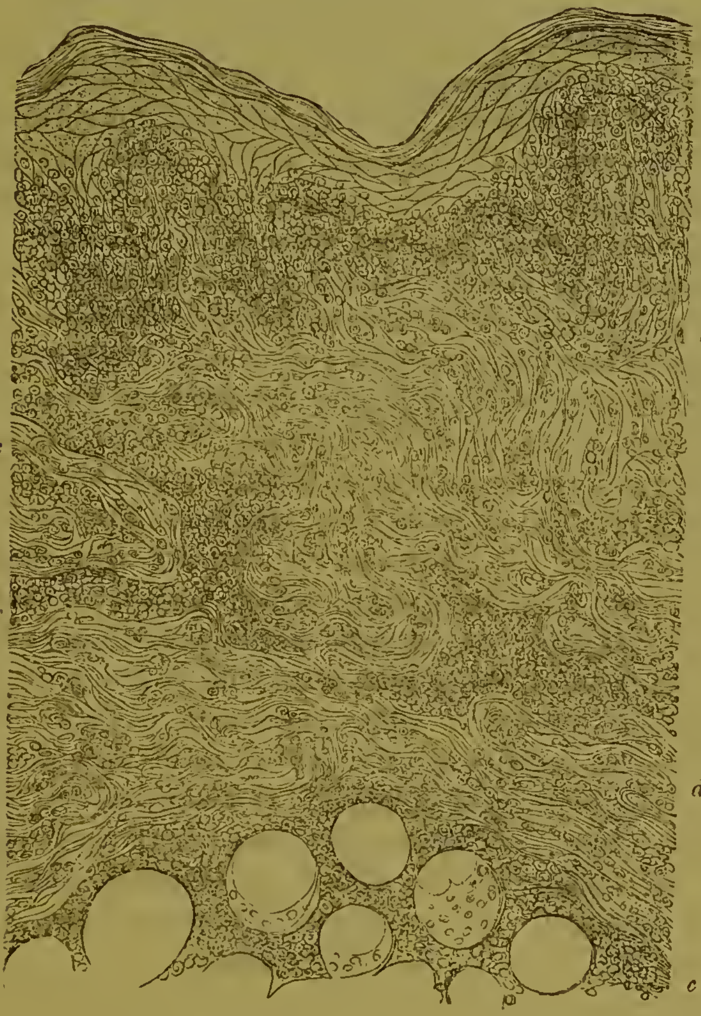
SECONDARY FORMS (*Syphilis*).

The so-called secondary forms are the following:—1. Syphilis cutanea masculosa; 2. tuberculosa, nodosa; 3. squamosa; 4. vegetans; 5. ulcerosa; 6. pustulosa; 7. bullosa (*Pemphigus syphiliticus*); 8. Rupia syphilitica; 9. Alopecia syphilitica; 10. Onychia syphilitica.

As a preface to the symptomatology of the above forms of syphilis, we may shortly notice the general characteristics of these affections. Syphilitic eruptions are distinguished from other skin affections chiefly by their chronic course; by their tendency to recurrence; by their hereditary character, as they may be transmitted even after a long interval; by their colour, which is coppery, or brownish red, in most cases, especially after protracted disease; by the peculiarity of the pigment in the rete Malpighii and corium, which undergoes changes in the several stages of the eruption; thus, on their first appearance, the maculæ of syphilis are bright red, and later assume a brownish tint, whilst the ulcerous varieties (radesyge) are coppery in colour; and lastly, by the absence of itching, even when the eruption is abundant.

Although syphilitic eruptions may extend over the entire cutaneous surface, they occur preferably on certain localities, and exhibit peculiarities in regard to grouping; *macular* syphilis, for instance, occurs chiefly on the trunk, *squamous* on the forehead, (*psoriasis*, on the palm of the hand, and sole of the foot), the *ulcerous* form on the scalp, and *pemphigus* on the hand and foot. These eruptions also assume various forms, as crescentic and orbicular patches; the varieties also are frequently combined, thus roseola often occurs simultaneously with papular syphilis. *Wertheim* explains the peculiar grouping of syphilitic eruptions by the nervous areas (Spaltrichtungen) which have been accurately described by *Prof. Langer*.

Fig. 38.



Syphilitic nodule from the upper part of thigh. *a.* Epidermis. *b.* Rete Malpighii. *c.* Cell infiltration in corium and panniculus adiposus. *d.* New growth of connective tissue. *e.* Papillæ.

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* *Wertheim* noted carefully the distribution of the eruption in thirty cases.

Syphilis cutanea maculosa (*erythematous*), *Fleckensyphilis*, *Roseola.* The eruption, which is preceded by slight febrile disturbance, appears in the form of pale-red or brownish spots, chiefly on the trunk, neck, and extremities, rarely on the face, sometimes also on the palm of the hand, as well as the tongue and soft palate; these maculæ are produced by local hyperæmia, associated with cell-growth along the capillary vessels. These spots, which vary in size and shape, may be annular in form (*Roseola annularis*). Roseola syphilitica is that form which is most rapidly developed as the result of the contagion. Syphilitic eruptions are distinguished from those of morbilli, and the erythemata by the absence of the catarrhal symptoms which accompany the former, and by the rapid course of the latter affections. As a further aid to the diagnosis in doubtful cases, the maculæ of roseola syphilitica are rendered more distinct by the action of cold on the skin. This form of syphilis, which frequently becomes papular, disappears in exceptional cases very rapidly; as a rule, when left to itself it lasts weeks or months, and usually leaves slight pigmentation.

Syphilis cutanea papulosa. This affection (Fig. 38) appears on the face in the form of papules or nodules (from the size of a pin's head to that of a pea or hazel nut), which are distributed over the entire body, with the exception of the dorsal surfaces of the hand and foot, forming groups, which at a later stage, become covered with scales; suppuration occasionally occurs at the summit of these papules, being associated with swelling of the adjoining lymphatic glands. The anatomical changes in papular syphilis are essentially similar to those of the indurated sore, *i.e.*, the rete Malpighii, papillæ, and corium are occupied by cells; the latter also appear in large numbers between the separate fat clumps of the panniculus adiposus. The connective tissue is tumified, the interstices distended, and occupied by cells resembling those in the other tissues.

Syphilis cutanea squamosa (*Schuppen-Syphilid*) may occur as a primary affection on isolated parts, or on the entire surface; it is preceded by febrile symptoms, and appears in the form of flat red maculæ, covered with scales, or the affection may be the sequel of a macular or papular eruption. On some parts, as the scalp, the scales are replaced by crusts which form crescentic or circular layers; the patients are cachectic, the lymphatic glands are swollen, and the hair falls out. On the scrotum and penis also crescentic efflorescences are formed, the skin being reddened and inflamed, so that the affection may readily be confounded with eczema. These phenomena, however, appear only in cases in which the primary symptoms have run their course.

This affection may be distinguished from *psoriasis vulgaris* by attending to the following points:—in psoriasis the scales are abundant, present a pearly lustre, are easily separable from the subjacent parts, and on removal expose a bleeding corium; whilst in syphilis the scaly mass is usually less considerable, and the other characters are absent (see psoriasis vulgaris).

Psoriasis palmaris and *plantaris*. Syphilitic eruptions on the palm of the hand and sole of the foot, present peculiar features; the primary efflorescence consists of isolated, brown, or brownish-red maculæ (of the size of a lentil, or larger), which sometimes disappear along with the other phenomena of maculo-papular syphilis on the skin, without leaving any traces; or a small scale is formed in the centre of the patch, which is thrown off, leaving a loss of substance, which is limited by a white border of epidermis: this depression is then filled up by epidermic masses, which are again shed, and thus the border becomes more and more elevated. By the confluence of several of these patches the skin becomes thickened, as the result of which (in people who work with the hands) fissures, or ulcers are formed, the movement of the hands being attended with pain.

Syphilis cutanea vegetans (*Condylomata lata, breite Condylome, Plaques muqueuses*). These condylomata are met with on the skin, and on the mucous membranes, and frequently constitute the only symptom of syphilis. They first appear as papules, or nodules, which spread, remain isolated or coalesce, and on the shedding of the epidermic layer, discharge a serous or purulent fluid, which readily transmits the contagion to healthy subjects, or to other parts of the skin with which it comes into contact; thus the surface opposed to the condylomata is infected, and mere separation (by charpie) is sufficient protection. These growths occur most frequently around the anus, on the scrotum, perinæum, prepuce, the inner surface of the thigh, the labia majora and minora, the navel, the female breast, in the axilla, and at the corners of the mouth and nose, and chiefly on parts which are supplied with large sebaceous glands and hair-follicles or deep furrows. On parts at which the perspiratory secretion is scanty, or the surfaces are not opposed, these condylomata are covered by a thin crust (desiccated pus).

Microscopic examination of broad condylomata shows constant enlargement of the papillæ, distention of their vessels, and considerable accumulation of cells. As these growths are only papules with superficial ulceration, we find similar changes, viz., accumulation of cells in the papillæ and sub-cutaneous connective tissue. According to *Biesiadecki,* the epidermic cells are degenerated, the prolongations of the mucous layer, which extend between the papillæ, are diminished in size, the epithelial cells destroyed, the papillæ being exposed. The ramifications of the vessels in the condylomata are also involved, cell proliferation being observed along their course.

Syphilis cutanea pustulosa (*Acne-Varicella-Impetigo-Ecthyma syphilitica*). This affection appears in the form of pustules, which are developed from a vesicular or papular eruption, or papules (resembling those of variola) which are rapidly changed into vesicles and pustules, on the desiccation of which, crusts are formed over more or less deep ulcers. This form of syphilis is usually accompanied by swelling of the glands (axillary, cervical, and inguinal); the patients are cachectic, and frequently suffer from disease of the fibrous membranes and from rheumatic pains. At first the pustules greatly resemble those of acne disseminata and varicella, but are readily distinguished from the former by the non-existence of comedones, and from the latter by the absence of febrile symptoms; at a later stage, these affections are not easily confounded.

Pemphigus syphiliticus. This affection is rarely met with in adults; we have seen only one case (demonstrated by *Prof. Zeissl*) in which the bullæ existed on the fingers. In young children, however, pemphigus is very common; the children are born with a vesicular eruption (chiefly on the palm of the hand and sole of the foot): a few days after birth the vesicles burst, forming superficial ulcers; or the affection may first appear on these parts as bluish-red maculæ (of the size of a lentil), which rapidly develop into blebs. In such cases, death (from exhaustion) ensues within a few days after birth, although the children may be tended with the greatest care as regards nourishment; the duration of life never exceeds two or three weeks.

Rupia syphilitica (*Schmutzflechte*) is a rare affection. As we have already noticed, in treating of impetigo, the crusts of rupia syphilitica are distinguished from those of impetigo by their accumulation in hard, dry layers forming a cone, on the removal of which, an ulcer bearing the character of syphilis is exposed. The crusts are produced by the desiccation of the purulent secretion, and as the discharge is usually abundant, and the cure of these ulcers rather slow, dense masses of crusts are gradually superimposed; the most important distinction, however, is that in impetigo merely an excoriation remains after the removal of the crust.

Syphilitic gummy tumor (*Gummigeschwulst*). This term is applied to certain large cutaneous tubercles, which are at first more consistent than at a later stage, when they become soft and gelatinous with viscid or purulent contents. They are developed chiefly in the deeper layers of the skin, and subcutaneous connective tissue, but also in the internal organs, where they form solid nodules (especially on the tongue, liver, brain, and lungs), and the bones.

Alopecia syphilitica. In addition to the loss of hair caused by ulcers and nodules on the scalp, baldness is also produced by derangement of the sebaceous glands, as the result of which the scalp is covered with dirty-yellowish masses of sebum, or with scales. The hairs become brittle (bulbs atrophied) and readily extracted even by combing. The loss of hair sometimes extends over the entire cutaneous surface. The subjects of this affection are usually cachectic; on the cure of the syphilis, however, and after the lapse of a few months the hair is renewed.

Onychia syphilitica is an affection in which the skin around the nail is reddened, swollen and painful; the swelling subsides or suppuration takes place, as the result of which, the nail is loosened and thrown off. Paronychia appears at the root and sides of the nails; these are also involved in disease of the palm of the hand, and sole of the foot; they first appear spotted, and later irregular, and of a dirty yellowish colour. The growing as well as the old nail become friable; painful fissures exist at the folds of the nail.

Syphilis in children. The syphilis of children is distinguished from that of adults by certain characters. In any case the peculiar earthy hue and waxy lustre of the skin, the scanty eye-lashes, and the "snuffling" sound in the breathing, are signs which attract our attention. In children, syphilitic eruptions seldom present the characteristic coppery tint (as in adults), but rather a pale-red or dirty-brown shade, and there is less infiltration around the pustules: these differences are explained by the anæmia which is usually associated with congenital syphilis, and by the shrivelled condition of the skin. Syphilitic affections of the bones are very rare in children; at a later period of life, however, congenital syphilis takes the form of periostitis, caries and necrosis.

Treatment. In many cases, the disease does not come under observation until the greater part of the symptoms have disappeared, the only remaining signs being pigmentary stains, cicatrices, etc. Such patients have frequently no idea of their disease, and have not therefore employed remedies—the disease has run its spontaneous course. We have, like other syphilologists, frequently adopted mere expectant treatment (as *extr. gramin,* etc.), and the morbid phenomena were protracted, but finally disappeared. We therefore conclude that syphilis runs a definite course, and whilst our remedies may shorten the disease, they will not prevent its recurrence; it is only in exceptional cases that a radical cure is effected.

Methods of treatment. The "simple method" introduced by *Fergusson,* consists in giving laxatives, and other simple remedies, as *Lign. guajac., Sal. amarus, etc.*

Inunction. This method is suitable in the dry forms of syphilis, as also in those cases in which the internal use of mercury is contraindicated. The ointment (*Ung. hydrarg. cin. fort,* ʒj. *Ung. Hydrarg. mit.* ʒij), ʒss.-ʒj, is to be rubbed in twice daily. When the skin is tender a smaller quantity is sufficient, and in the case of children 10 grains. As *Overbeck's* experiments (on dogs) have shown, the metallic mercury is absorbed, minute globules being observed in the cellular tissue of the corium, kidneys and liver. The ointment is to be rubbed in at night after the patient has had a warm bath, so as to induce perspiration for some hours. On successive days the ointment is rubbed into the following parts:—1. legs, 2. thighs, 3. abdomen, 4. loins and sides of chest, 5. upper arms, and 6. forearms. The inunction is continued until salivation is produced, or the disappearance of the syphilis. In some cases salivation occurs after the first inunction, in others it may not appear after fifty or sixty inunctions.

Internal use of mercury:—1. *R. Hydrarg. bichlor.* gr. j. *Solve in paux, aquæ dest., adde Extr. et pulv. rad. liquir. aa. q. s. ut. f. pill* xxiv. *S. daily* 2, 4, *and* 8. *R. Hydrargyr. bichlor* gr. j. *Solve in Aq. destill,* ℥xvi. *S.* from two to four drachms daily. *Lewin* has successfully employed corrosive sublimate, in the form of subcutaneous injections (gr. j. *ad aq.* ℥iv); salivation is rarely induced by this method. In 1860, *Hebra* suggested to me (as second physician to the skin department) to try these injections, but as the results were not more successful than by the other antisyphilitics, the experiments were discontinued. *Sigmund, Köbner,* and *Grünfeld,* have also tried this method.

2. *Iodide of mercury.* *R. Hydrarg. proto iodid* gr. iv. *Opii puri* gr. ij. *Pulv. liquirit., Extr. liquirit aa,* ℈j *M. f. pill* xxiv. *Consp. pulv. rad. liquirit. S.,* from one to twelve daily *Calomel* (*Weinhold's* method). *Calomel lævigat.* gr. iv, *Opii pur.* gr. j. *Sachar, alb.* ʒj. *div. in dos.* xii, ten to twenty grains daily; salivation is readily induced by this treatment.

3. *Hahnemann's preparation: Hydrarg. oxid. nigr.* ʒij, *Conserv. rosar. Pulv. liquirit aa* ʒj. *Form pill* gr. v. 1-2 *pieces* daily. The permanganate of potash is used in the same doses as the iodide.

4. The iodides of potash and soda are used in solution or in pills (ten to twenty grains daily) chiefly in the so-called tertiary forms of syphilis.

Local treatment. The *Emplastrum mercuriale* is one of the best local remedies; indurated sores and papules disappear more rapidly under this, than general treatment. It is especially useful in corona syphilitica for removing the eruption on the face, also in syphilis on the buttocks of children. Broad condylomata are frequently cured by merely placing charpie between the opposed cutaneous surfaces, the cure is effected more rapidly by caustics: *a.* Sol. *Plenkii* (mod.) *R. Hydrarg. subl. corros. Spirit, vin. rectif., Alumin Cerrussæ, Acet. vini, Camphor aa part æqual.* *b.* Sol. *Labarraquii i e., Chlor. liquid., Calomel ad.* ʒj. *c. Hydrarg. subl. corros.* gr. iv., *Spirit vin rectif* ℥j. *d. Hydrarg. corros.* ʒj, *Collodii puri* ℥j, *Ether sulf.* ʒij. *D. S. collodion sublimate.*

5. The use of *Zittmann's* decoction is attended with good results, especially in the case of ulcerating syphilis, one lb. Dct. fortius, (No. 1) to one lb. Dct. mitius, (No. 2). The first has the following ingredients:—*Rad. Sarsaparill. lb. Inf. c. Aq. f. libi.* 72, *et dig. p. hor.* 24. *Dein adde int. sacc. lint., Pulv. sach alb., Alum crud. aa* ʒvi. *Calomel* ℥ss. *Cinnab. fact.* ʒj, *Coq. ad. col. libr.* xxiv *Sub. f. coct. adde. Semin. anisi vulg.—foenicul. aa* ℥ss., *fol. senn. Rad. liquirit* ℥jss, *Exprim per pannum, cola.* Dt. Zittm. with No. 2. *Sarsaparill. conc.* ℥vi, *Add. specieb. e. decoct fortior. residius coq. cum. Aq. font. libr.* lxxii, *and col. libr.* xx. *Sub. fin coct. adde: Cort. fruct. citr., semin. cardamon. minor., cort. cassiæ, cinnamon, rad. liquirit. aa* ʒiij *exprime per pann-cola.*

Voigt, Schneider, and *Van der Broek,* showed that *Zittmann's* decoction contained corrosive sublimate. It was formerly believed that this remedy was not suitable in the case of old standing syphilis in ill-nourished cachectic subjects, but our experience in hospital and private practice, does not confirm this view. The effect of the remedy is not apparent during the first week, even in the ulcerative forms of syphilis in which it is most rapidly seen, but in the second, third, and fourth week, the improvement is remarkable.

6. *The Dect. Pollini* (consisting of a decoction of sarsaparilla and *radix Chinæ nodos, Lapid. pumic., Antim. crud. aa* ʒss. *Putam, nuc. jugl.* ℥x, *Coq. aq. f. libr.* iij, *ad rem. libr.* j.), is greatly inferior in its results to *Zittmann's* decoction.

Amongst the vegetable drugs, which only act as diuretics and diaphoretics, are the following :—

7. *Rad. Bardanæ, Saponar. H. Viol. tricolor., Cort. Mezerei, Lobel. Extr. conii maculi., etc.*

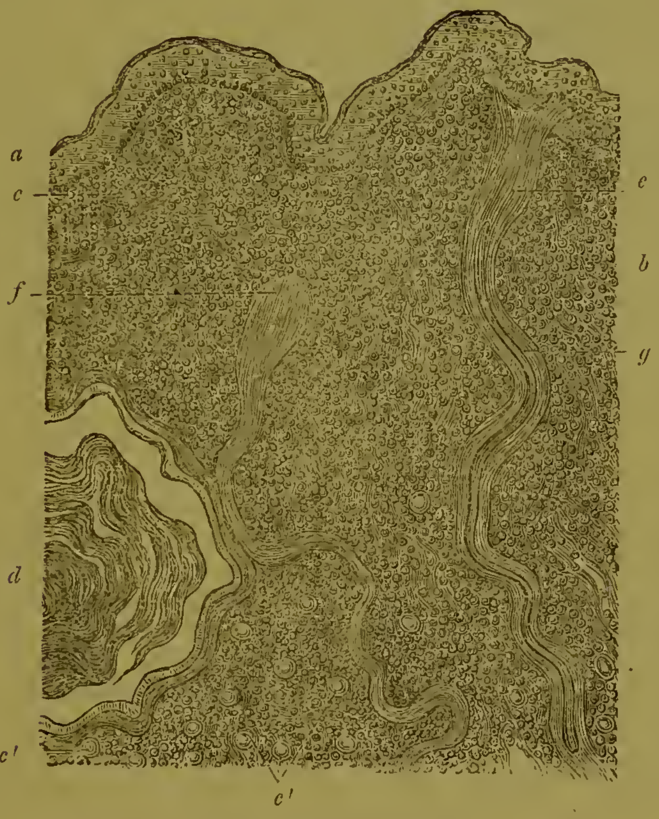
R. Infus. rad. sarsaparill. ex ℥j. *ad col. libr. Macera p.* 24, *horas, dein coq. ad reman.* ℥viii, *adde: Aq. laxat. Vienn., Syrup sarsaparill. aa* ℥j. *S.* to be taken in the forenoon ; or

8. *Dect. Bardan* (*Hebra's* prescription). R. *Dect Bardan ex.* ℥j-℥viii, *Infus. fol. senn. ex.* ʒij-ʒij, *Sal. amar* ʒij.

3. ELEPHANTIASIS GRAECORUM (*Lepra Spedalsked*).

This disease, which is entirely distinct from Elephantiasis Arabum, presents the following varieties :—*E. maculosa, E. tuberculosa,* and *E. anæsthetica.* The affection appears between the ages of ten and fifteen in the form of reddish coppery spots on the face (chiefly on the eye-brows), and may retain the non-tubercular character for years (*Leontiasis*). The disease is ushered in by an indefinite feeling of malaise, dislike to every kind of exertion, and melancholy; at a later stage there are pains in the joints, bones and muscles, the nerves are frequently swollen, in considerable tracts. The stains (which are designated with the term vitiligo (?) *alba, nigra, spiloplania, lepra radiata),* are coppery in tint and develop into papules; the latter are semi-globular or flat, more numerous on the extremities (especially the hands, arms and feet) than on the face and trunk. Simultaneously with them are also formed papules (resembling condylomata), on the mucous membranes of the palate and larynx, and on the lips. The papules soften and ulcerate, and the skin becomes dry, fissured and wrinkled. The ulceration then extends gradually to the deeper parts, the muscles, tendons and joints being destroyed. In some cases the skin is diffusely thickened, and the surface covered with scales. The senses of hearing, smell, and taste, are lost. The eye is also involved, the cornea becomes opaque, or the entire globe shrivelled. The ulcerative process extends to the internal organs, and the fatal result is induced by tuberculosis of the lungs, or intestinal canal. In L. anæsthetica, there is first, hyperæsthesia with the most acute pain, and later anæsthesia ; in rare cases paralysis supervenes.

Fig. 39.



Section of a leprous papule from the skin of the forehead. *a.* Epidermis and rete Malpighii. *b.* Cutis with cell infiltration. *c.* Groups of colloid granules. *c'.* Colloid globules. *d.* Disorganized and dilated sebaceous glands, with accumulated epidermoidal contents. *e.* Coiled hair-follicle with atrophic hair. *f. g.* Sinuous connective-tissue strand, formerly the hair-follicle (?).

Anatomy. In a leprous papule from the scalp I observed the following changes (Fig. 39), the papillary body elevated, and the entire cutis thickened – the normal tissue being replaced by minute cells, (which are slightly expanded by acetic acid) so that on some parts there are only scanty remains of fibrous connective tissue. The fatty tissue is also destroyed. The special seat of the morbid process is the corium, in which we find at first scattered colloid cells, with a more homogeneous substance, refracting light, (colloid degeneration). In the superficial portion of the corium we observe layers which consist of aggregated colloid globules. We also observe thick bundles, extending towards the surface which, on minute examination, are recognized as hypertrophied smooth muscular fibres. Lanugo hairs occur everywhere, their sheaths apparently unchanged or coiled like an S, extending sometimes deeply into the corium. The sebaceous glands are mostly destroyed; dilated follicles occur in great numbers, and appear filled with dry epidermis and sebum.

According to *Virchow,* the new cell-growth (*granulation*) extends close to the nearly unchanged epidermis, as in lupus, and thence deeply into the subcutaneous cellular tissue. The new growths usually form larger strands (Züge) which are intimately connected with each other, and are most strongly developed in the area of the hair-follicles, in which they probably originate (*Danielssen Böck, Köbner* and *Simon* give similar results). The strands extend into the subcutaneous tissue, and are recognised even by the unaided eye by their transparent, lustrous, whitish gray, or yellowish aspect. The normal tissue still remaining between them, presents a more whitish or yellowish aspect. The vessels exist in moderate numbers, and extend into the masses. The cells vary in shape and size, according to the conditions of development. The development of simple spindle-shaped or stellated connective-tissue cells is nowhere better seen; there is a continual production of small roundish cells, between which the old intercellular substance becomes gradually more scanty, so that between the cells (arranged in rows and groups) are seen only narrow strands of somewhat striped substance, the nuclei of which are rendered opaque by acetic acid. Within the connective tissue, free nuclei are observed in large numbers. The epidermoidal structures become more and more atrophied with the progress of the disease. Sweat and sebaceous glands are destroyed; the hairs themselves degenerate, and in their follicular portion dilatations are formed with epidermoidal accumulations; the hairs break off at the surface. The cells at their highest development form pale slightly granular elements, mostly nucleated. Many of these cells are not larger than the red blood-corpuscles; the majority are about the size of the ordinary lymph corpuscles; others somewhat resemble the largest mucous corpuscles.

Between the strands and foci (Heerden) of the growing structures, other tissues remain unchanged, or undergo simple hypertrophy; the latter condition is well seen in the *arrectores pilorum.* The leprous ulcer, which discharges thin ichorous matter, is usually covered with dry, brownish or dirty crusts; beneath this there is a soft liquefied mass. The leprous papule, however, has no special tendency to ulceration, this being induced only by unfavorable external agencies.

In *Morphœa nigra* there is a deposit of dark pigment in the rete Malpighii; in *Morphœa alba* a white cicatrix is formed, from which the epidermis is shed. In *Lepra anæsthetica* (*nervorum*) the nerves are thickened, the cell-growth being most profuse around the neurilemma; finally the nerves are completely atrophied, and the medullary sheath and axis cylinder undergo myalin degeneration (see Beiträge zur Pathologie der Lepra mutilans, *von Dr. F. Steudener*, in Halle). The off-shoot of the vessels are thickened, and (at parts) obliterated by a colloid and glistening deposit. The grey matter of the spinal cord also undergoes a similar degeneration, the nuclei assuming the colloid aspect. In the ulnar, radial, and median nerves, the bundles are changed into dense fibrous tissue, the vascular walls and the neurilemma thickened, the cell elements increased; the medulla and axis cylinder obliterated; in some cases the medulla is changed into a fine granular mass (fat). The lymphatic glands also enlarge, and the cells undergo fatty degeneration.

Pemphigus leprosus, lepra sub adustionis specie latens (*Schilling*) *Malum mortuum, Malmorto.* The disease commences with the formation of bullæ (ranging in size between that of a pea and that of a walnut) which are produced by effusion of turbid serum beneath the epidermis, and the morbid process extends into the deeper tissues; the bullæ, which at first resemble those of pemphigus, burst, leaving deep cicatrices, at other parts only white stains; sensibility being impaired in proportion to the extent of the disease. The perspiratory and sebaceous secretions are in abeyance; and at length the entire cutaneous surface is involved; the limbs become contracted, the fingers and toes being lost, and the fatal termination is ushered in with diarrhœa and convulsions. The membranes of the brain and cord display exudation deposits.

Etiology. All authors agree in regarding the disease as dependent upon hereditary predisposition, the effects of which may, however, be warded off by altering the mode of life and circumstances of the patient, and also by change of climate. In Norway, the disease is especially frequent amongst fishermen who live in unhealthy dwellings and subsist on bad food. Leprosy seems to have first appeared in the marshy districts along the banks of the Nile, and is still indigenous to islands and maritime countries, *e.g.*, Madagascar, Mauritius, Madeira, the Greek Archipelago, the coast of the Black Sea, Mediterranean, Crimea, Norway, and Greenland. The disease is transmitted to children more frequently by the mother than by the father; it sometimes re-appears after having passed over several generations. The affection seldom appears before the age of seven, mostly after the period of puberty;

if it occurs before puberty, the development of the sexual organs is usually arrested—a result which is more frequent in the case of males.

Treatment. Amongst the remedial agents which have been recommended are cod-liver oil, arsenic, iodide and bromide of potassium, iron, mercury, as well as sulphur baths and venesection. In the countries where the disease prevails, the roots of *Asclepias gigantea* and *Hydrocotyle Asiatica* are used; the latter in conjunction with mercury, the *Mudar* root with linseed in poultices; *villarine* is the active principle in the hydrocotyle. All these remedies, however, have hitherto proved futile.

B. *Tumours.*

(*Homœoplasia, Heteroplasia, Neoplasma, Pseudoplasma*).

The term tumour is applied to a new growth, the tissue of which is more highly organised than that of inflammatory products. Tumours were formerly classed as homœoplastic and heteroplastic (*Lobstein*), the former being regarded as similar in structure, whilst the latter present no resemblance to the normal tissues. As we shall presently see, this division cannot now be maintained, as tumours of every kind are formed by normal elements. Homœoplastic growths have been regarded as *benign* and heteroplastic as *malignant*, but this view has also been proved erroneous. *Virchow* distinguished homœoplastic and heteroplastic new growths, the structure of the former resembling that of the tissue in which it exists (Mutterboden), that of the latter differing from it (*e.g.*, cartilage in the scrotum). This classification is regarded as clinically correct, only in so far as it refers to certain characters, as the rapid growth, recurrence after removal, and pain of malignant tumours, or the slow growth and non-recurrence of benign tumours, although the latter may assume the malignant character from their seat (as in the brain and heart) or from their number.

It was formerly believed that new structures were produced only from the connective-tissue cells. *Beer*, *Remak*, *Kölliker*, *Thiersch*, *Hiss*, and *Reichert* have, however, sufficiently shown that even in the embryo the disposition to the formation of certain tissues exists, so that like produces like tissue, and from one embryonic layer (Keimblatte) a definite development proceeds. In this sense, therefore, we cannot speak of heterologous structures.

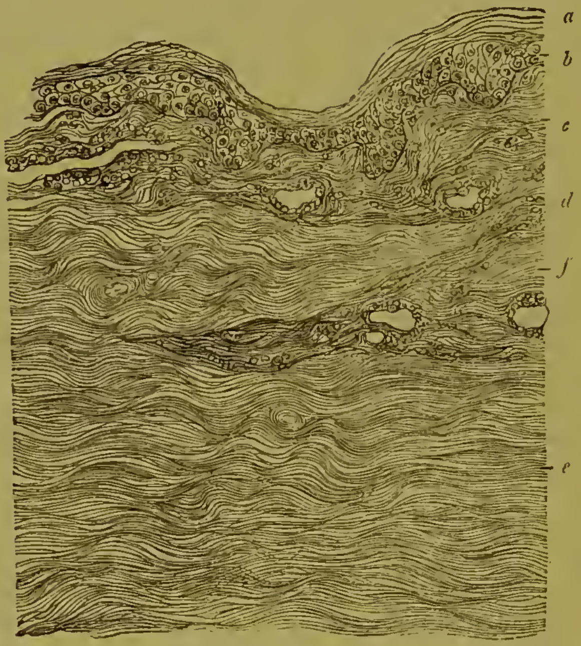
As to the origin of the cells from which new growths arise, it was at first believed that they were formed from exudation (*Henle, Rokitansky*); this view is now discarded, as it is known that other sources exist. Cell-growth takes place: 1. by *division*, the protoplasm and nucleus being divided into two, four, or more cells; 2. by *gemmation*, a bud being thrown out in which a nucleus is afterwards formed (as in nerve fibres); 3. by *endogenous growth*, abundant nuclei being formed in the protoplasm; each nucleus being invested with protoplasm, forms a cell. Some cells originate in the blood, as white blood-corpuscles, which escape through the capillary wall and remain unchanged, or assume the character of those tissues into which they migrate. The connective-tissue cells increase either by division or (probably) from migrated cells. The connective tissue is the substratum from which most of the new growths are formed.

The tumours which are of most interest to the dermatologist have been partly described in the chapter on hypertrophy, these conditions being closely allied; we shall also adopt the clinical classification of *benign* and *malignant*, which, although histologically inaccurate, is useful in practice. As benign growths we shall describe keloid, teleangiectasia, fibroma molluscum, papilloma, and atheroma, and as malignant epithelial carcinoma.

1. KELOID (κηλις, *Cicatrix*), CHELOID, (ἥλη, *Krebsscheere, Vogelkralle*).

Keloid is a new growth of the fibrous element of the connective tissue, forming whitish or pale red (usually isolated) elevations on the surface, appearing on the upper part of the trunk, the extremities, and sometimes also on the face, in the form of mesh-like and anastomosing tumours of variable size, and frequently in great numbers. *Alibert* first applied the term *cancroid* to this growth, but latterly adopted that of *keloid*. He distinguished the *true* from the *false* or *spurious* keloid; the first arises spontaneously, from unknown causes; the second form occurs frequently on the chest and back, as the result of the cicatrices of burns and wounds, or the eruptions of variola, syphilis and acne indurata. This affection is attended with considerable pain. The keloid, as above mentioned, commences with a white, yellow, or brownish discoloration of the skin, which is distinctly circumscribed (varying in size between a lentil and half-a-crown), the vicinity of the patch being more or less reddened; the discoloration may disappear or remain unchanged for years, or gradually extend. The affection is attended with itching and dragging pain, which is increased by the pressure and friction of the clothes ; at parts of the growth, depressions or shallow furrows are formed, the intervening portions being elevated in the form of white or yellowish-red nodules, or streaks, extending in strand or claw-like processes beneath the adjacent normal cutis, which becomes wrinkled and contracted. The entire growth resembles the hypertrophic cicatrix of a burn.

Fig. 40.



Section of keloid (from the forehead). *a.* Epidermis. *b.* Rete Malpighii. *c.* Tissue of cutis. *d.* Remains of cutis. *e.* Dense fibrous tissue of keloid. *f.* Cell infiltration around the adventitia.

The subcutaneous connective tissue becomes involved in the process of induration. The hairs usually fall out. The participation of the nerves is indicated by the severe pain which alternates with the altered sensibility ; complete anæsthesia has not hitherto been observed, but in some cases the affection is painless during its entire course. The results of the affection are contraction of the skin, at the seat of the morbid process ; flexion or extension of a joint, with partial or complete immobility, atrophy of muscles, etc.

Anatomy. The true keloid (Fig. 40) is formed of parallel connective tissue bundles, which are embedded in the substance of the corium; at a more advanced stage of the growth, the corium is completely replaced by these connective tissue strands. The cell-growth extends along the vessels. The sebaceous and sweat-glands at first remain unaltered, but disappear at a later stage.* The development of the growth takes place in the following manner: — spindle-shaped cells extend in broad tracts along the course of the vessels, and even into the normal tissue. This change in the adventitia is especially marked at the edges of the growth, and at the parts at which the arteries send off-shoots into the papillæ. The development of the disease, therefore, proceeds from the vessels of the corium. In histological characters the true and false keloid are indistinguishable (*Warren.*)

Treatment. The treatment of keloid has not hitherto afforded favorable results: in a few cases only the growth has been exterminated by repeated operations. Caustic remedies, as also tincture of iodine, iodide of glycerine, chlorate of potash, (*Lisfrank*) ioduret of mercury (*v. Pitha,*) are useless. In one case, *Dumreicher* succeeded in exterminating a keloid of the lip, by applying a mixture of *saccha. saturn* ʒj, *alum* ʒss, *ung.* ℥ss.

FIBROMA MOLLUSCUM. (*M. Simplex*).

These are soft, pedunculated, and sac-like growths, which appear singly, or in groups, over the entire cutaneous surface: they vary in size between that of a pea, hazel-nut, man's fist, or may be even larger. They occur preferably on the nipple, and labia majora and minora. These tumours are sometimes congenital, but more frequently appear at maturity; their growth is very slow. In some cases they attain an enormous size (even to forty pounds in weight), and besides causing deformity may endanger the life of the patient if gangrene supervene, the fatal termination being due to pyæmia or marasmus.

Anatomy. Microscopic examination shows the tumour to consist of young, gelatinous connective tissue (Fig. 41), enclosing loculi, filled with yellow, albuminous fluid which can be squeezed out; these spaces are traversed by fine fibrous septa. From this locular structure, *Virchow* concludes that the deeper growths originate in the panniculus adiposus, the more superficial ones being formed from the corium. Cells occur abundantly in the *areolis* (*Virchow's* granulation tissue). In some cases we observe enlargement of the sweat and sebaceous glands, as well as increased deposit of pigment.

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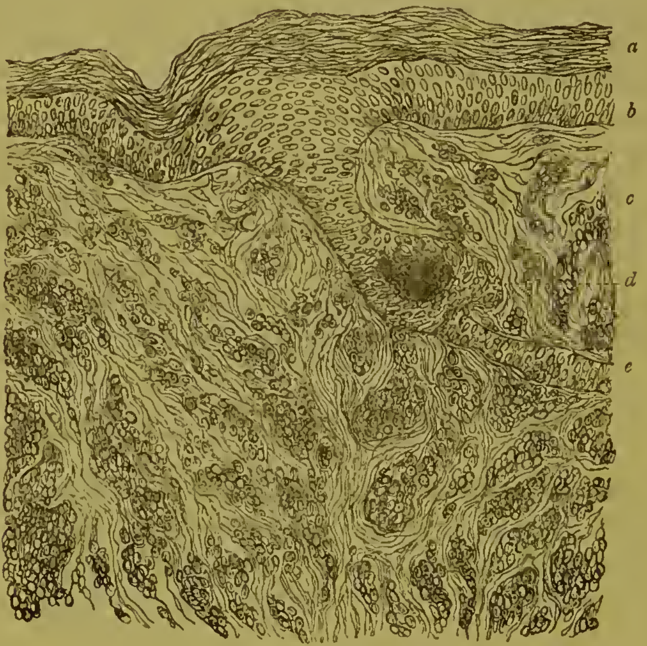
* Whilst the first edition of this work was passing through the press, I received a valuable essay on keloid, by *Dr. Warren*, from which I observe that his independent researches accord with the above description, (Sitzungsbericht der kaiserl. Akademie). According to this author, it is probable that the recurrence is due to the cell accumulation along the vessels.

Treatment. As these growths are attached only by a thin pedicle, they are easily removed by the knife, scissors, ligature, "ecrasement lineaire," or galvano caustic. From the distended state of the vessels, there is often considerable hæmorrhage after the removal of the tumour; this may, however, be avoided by uniting the edges of the wound, so as to induce healing by first intention.

Fig. 41.



a. Epidermis. *b.* Rete Malpighii. *c.* Cutis infiltrated with cells. *d.* Section of a sebaceous gland. *e.* Epithelial strand.

ANGIOMA, TELANGIECTASIA, NÆVUS VASCULARIS

(*Gefässgeschwulst Gefässmal.*)

These occur in the form of light, dark, or bluish-red growths fire mole (*N. flammeus*). The colour varies with the situation of the tumour, and its arterial and venous supply: the arterial nævi are more superficial, and of a lighter tint; the venous are more deeply seated, and darker in colour. Their size varies; some are punctated, or of the size of a lentil, sixpence, or half-a-crown, others are larger. These vascular growths sometimes cover extensive areas of the skin, as the entire face, neck and extremities. Sometimes they are superficially distributed, forming elevated tumours. In most cases, they are congenital, being more frequently met with in children than in adults. In infants the skin is almost always marked by some of these red stains, consisting of newly formed vessels; most nævi, however, disappear spontaneously.

The teleangiectasiæ consist of distended or new capillary vessels, occupying the circumscribed, vascular areas of the sweat and sebaceous glands, hair-follicles, and fat lobules; the nævi thus acquire the lobular structure which is perceptible to the naked eye. In some tumours the connective and adipose tissues constitute the stroma between the vessels. In the majority of instances there is undoubtedly an hereditary predisposition to the formation of nævi. In these tumours the growth is slow, and unattended with pain. They are distinguished from *tumor cavernosus* by their slow growth, and the complete absence of pain, and also by their hereditary nature. *Nævus vasculosus* or "fire mole," is distinguished from teleangiectasia, by the fact that it never increases after birth, whilst the latter growth extends.

Treatment. As the telangiectasiæ frequently disappear spontaneously, we resort to treatment only in cases in which they extend. In addition to the modes of extirpation by the knife, galvano-caustic, acupuncture and ligature, the following methods may be noticed:—

1. The application of a plaster, consisting of *Empl. adhæs.* ʒij, *Tart. emet.* gr. xviii, as recommended by *Zeissl.*[*]
2. Injection of a solution, consisting of one part Liq. ferr. sesquichlor. and one part water.
3. Inoculation with vaccine lymph.
4. Inunction with croton oil.
5. Cauterization with sulphuric or nitric acids.

In the smaller growths, occurring on the scalp, I have adopted *Zeissl's* method; this is certainly to be preferred in the treatment of flat tumours, as the remedy can be applied without difficulty, the pain being very slight, and the resulting cicatrices extremely thin and smooth. The disadvantages are the length of time required for the cure, and the effect of the tartar emetic in producing pustules, which are especially disagreeable, on the forehead and scalp: these unpleasant results, however, are not of much consequence when compared with the advantages of this method of treatment. The cicatrix thus produced is white, soft and thin; and the hair is renewed (although only after several months), and this advantage should not be overlooked in the treatment of tumours of the scalp.

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[*] Dr. Cumming recommends galbanum plaster (15 gr. to 1 dr. *Lancet,* 1851).

In several cases I have injected the nævi with the solution of iron and water by *Pravaz's* syringe, without producing coagulation of the blood and subsequent shrivelling of the growth. In these cases the tumours became gangrenous, the eschar being thrown off after a period of fourteen to twenty days, exposing a deep excavation, which was repaired by cicatricial tissue only after a long time. As a precaution, I tried this method only for nævi on the chest and back.

The method of inoculation (of course suitable only in children who have not been vaccinated), has afforded surprising results in some cases. I notice the following case as especially remarkable. It occurred in a child, aged two years, with a vascular nævus which involved the tip and alæ of the nose, in the form of an elevated multi-locular growth, extending even to the nasal mucous membrane. As in this case it was desirable to avoid an operation involving hæmorrhage, or subsequent deformity, I resolved to try the inoculation method; with this view, I introduced a considerable quantity of fresh lymph into the deeper tissues at the base of the tumour, making about ten superficial and deep punctures. On the eighth day the pustules were completely developed, and several became confluent; the entire tumour became covered with a crust which was shed spontaneously after the lapse of a month. The child remained under my care for several weeks, when the tumour had considerably decreased in size, and as its complete disappearance seemed likely to be tedious, I sent the patient home. When I saw the case again, after the lapse of a year, the site of the nævus was indicated only by a few strands of cicatricial tissue.

With the view of producing suppuration (pustules) in the skin, the inunction of tartar emetic is to be preferred to croton oil: the latter may indeed give rise to great irritation, for in one case where it was used, I had to contend with most severe lymphangiotis. The use of sulphuric and nitric acids, as caustics, sometimes gives favorable results.

PAPILLARY GROWTHS (*Papillargeschwülste*).

In treating of hypertrophic affections, we described the true papillary growths, viz., warts, cornu cutaneum, pointed condylomata and ichthyosis; we have, therefore, only to notice here certain pedunculated or sessile growths, consisting of hypertrophied papillæ with distended vessels, which occur chiefly on the penis, the face, as well as the hands and feet; these tumours vary in size from that of a pea to that of a hazel nut, their surface being covered with numerous minute projections. This form of growth is merely a compound wart, and it may be as readily removed.

In the *inflammatory papilloma* (according to *Roser*) suppuration takes place within the papilla, the pus being accumulated at the base, and the club-shaped points enlarged: a probe may be passed through the tissues which are undermined. This papillary growth occurs on the face, as well as on the hands and feet.

ADENOMA.

As in other glandular structures (*e.g.* mammary and prostate), so in the glands of the skin, the epithelial structures may constitute tumours: thus Rindfleisch treats of "sweat-gland adenoma," and regards lupus also as adenoma of the sebaceous glands; according to our view, however, this applies only to lupus erythematodes.

CANCER and SARCOMA.

To this group belong all forms of sarcoma and cancer; *epithelial* carcinoma, *i.e.*, glandular cancer of the skin and mucous membranes; *fibrous* glandular cancer which sometimes occurs as infiltration in the corium; *medullary* glandular cancer, in which the gland-like structure is prominent, and *sarcoma melanodes.*

EPITHELIAL CANCER (*Carcinoma epitheliale*).

This term is applied to a growth which originates chiefly in the skin or glands, extending rapidly to the lymphatic system; it returns after extirpation mostly on the same situation. Cancers being chiefly epithelial new growths (which have a more glandular structure), we shall treat only of *epithelioma* as the type of the group (cancroid, papilloma) which is of most interest to the dermatologist; according to *Schuh*, this growth presents the following forms:—*a. smooth; b. alveolar, nuclear; c. wart-like.*

a. The *smooth* variety of cancer occurs mostly on the lips, cheeks, nose and forehead; it appears only during advanced life, and developes from papules, which disintegrate, forming shallow, excavations, the periphery of which is marked by a hard ring. The morbid process always continues for several years without materially affecting the system; eventually, however, the parts involved are completely destroyed, and the patient succumbs to marasmus.

b. The *alveolar* form extends peripherally as well as in depth, its structure is distinctly alveolar. The morbid process usually runs an acute course, and is attended with a considerable amount of pain. The disease commences with the formation of nodules, which are moveable under the skin; at first these are isolated, but later coalesce and disintegrate, forming extensive ulcers. This form of cancer occurs mostly on the mucous membranes, but may also affect the skin, as on the cheeks and extremities.

c. The *wart-like* variety presents the form of club or wart-like structures (resembling cauliflower excrescence) on the surface of the skin, being distinguished from the ordinary wart by its rapid growth and surrounding infiltration. There are thus formed roundish painful tumours, which are covered with crusts.

Anatomy. In this growth the epithelium of the skin and its glands assumes the form of round cylinders, extending into the tissues, which at parts become hardened, or softened, forming loculi in which cells are accumulated; the vessels are dilated, or new ones are formed (*Billroth*). In epithelial and glandular cancer, the epithelial cells are enlarged and accumulated in the glands; at a later stage they become aggregated, forming round masses (ganze Kugeln), in the centre of which we frequently find larger cells containing numerous daughter cells; here also the spinous or furrowed cells are frequently met with. In the connective tissue of the cutis, alveolar spaces are formed, which are occupied by the cells (above described); there is simultaneous enlargement of the papillæ, and new formation of vessels. In other cases the epithelial cells disintegrate and an ulcer is formed, or the epithelial elements extend into the cutis, thus forming an infiltration (flat and infiltrated epithelial cancers). The epithelium of the sebaceous glands is also increased, and the connective tissue becomes infiltrated with minute cells. Lastly, the entire infiltrated tissue is thrown off, and ulceration and cicatrisation supervene, whilst the affection extends from the periphery. This view of the formation of carcinoma was first promulgated by *Thiersch*, and it is now accepted by *Billroth*; it is entirely opposed to the opinion of *Virchow*, however, who traces the origin of epithelial carcinoma from the connective tissue. *Pagenstecher*, of Heidelberg, found that in carcinoma the epithelial cells migrated from the corium into the Malpighian layer, so that one half of each cell remains in the papilla, whilst the other half is in the rete Malpighii. These cells have independent locomotion, and become transformed into epithelial cells; the migratory cells, therefore, *i.e.*, the white blood-corpuscles, which escape from the vessels, afford the most important pabulum for the new growth of epithelial cells.

Treatment. The dermatologist will resort to remedial measures only in cases of epithelioma, which is easily destroyed by caustics. The following are the caustics employed in slight cases, *i.e.*, in the early stages of the disease :—*Nitrate of silver* (solid, or in solution with equal parts water), *Landolf's paste* (which is also successfully employed in lupus), *Caustic potash* (solid), *Vienna*, *cancoin*, and *cosmic pastes*, and the *galvano-caustic* are also used with good results. We have frequently effected a cure by the application of *Hebra's* modified cosmic paste.

CARCINOMA OF THE CORIUM.

This affection is a variety of medullary cancer, which is less frequently met with ; it commences in the corium with the formation of tumours (from the size of a lentil to that of a pea), which are moveable, and appear of a reddish colour through the epidermis. These tumours, which gradually or rapidly enlarge, undergo ulceration, and become covered with thick crusts. In some cases the entire tumour becomes gangrenous, and is thrown off, leaving a smooth cicatrix ; in other cases only a part of the growth is separated, and the remaining portion becomes covered with epidermis. It sometimes happens that the lymphatic vessels between the several tumours may be felt through the tissues as hard, rough strands. This form of tumour may exist on one of the limbs for years without giving rise to any particular pain, or altering the general aspect of the patient. In most cases, however, the entire cutaneous surface is gradually attacked with the disease, and the patient succumbs to pyæmia. On post-mortem examination, the internal organs are usually found to be similarly affected. Whilst the nodules remain hard they resemble fibrous carcinoma, and only at a later stage assume the medullary character.

SARCOMA MELANODES (*Pigment sarcoma*).

This, which is distinguished from ordinary sarcoma by the presence of pigment, presents the form of dark-tinted, wart-like structures; in some cases the disease remains stationary for years, and then rapidly extends, terminating fatally in a short time. On post-mortem examination of such cases, we find melanotic deposits in the internal organs, especially in the liver and lungs.

CLASS VII.

ANOMALIES OF PIGMENTATION.

The cells of the rete Malpighii, in their normal condition, contain a variable quantity of pigment, the deeper layers being darker, the more superficial of a lighter tint; the epidermis is devoid of pigment. In the negro, the pigment is darker than in other races. The parts of the cutaneous surface at which the pigmentation is most marked, are the nipple, the pudenda, the penis, the scrotum, and around the anus; the skin at these parts somewhat resembling that of the negro. The tint depends upon the amount of pigment, degree of vascularity, and thickness of the epidermis. The colour of the skin, however, depends not merely on the amount of pigment, but also on the variations in the quantity and quality of the blood, on extravasations, and, lastly, on abnormal pigmentary deposits. In chlorosis or anasarca, for instance, the cutaneous surface is pale; whilst in full-blooded people, and especially in drunkards, it is of a dark colour. The yellow skin of jaundice is due to absorption of the colouring matter of the bile, and the dark tint in sarcoma melanodes to black pigment from the blood. As we shall presently see, dark coloration is also produced by the long-continued use of certain alkaloids.

Under morbid conditions the pigment of the skin may be augmented or diminished; and thus some parts of the surface appear darker, and their immediate vicinity lighter than the normal colour of the skin.

A. *Increase of Pigment.*

From the increased deposit of pigment in the skin, a variety of conditions are produced, of which the following are the most important:—nævus, pigment mole, ephelides, freckles, lentigo, stains, chloasma, liver-spots, melasma, etc.

NÆVUS TUBERCULOSUS, HYPERTROPHICUS (*Nævi materni, Moles, Envies, Taches, Pigmentmal*), including:

a. Nævus lenticularis is usually congenital, and occurs in the form of slightly raised and distinctly circumscribed spots (from the size of a pin's head to that of a lentil) of a lightish or dark-brown tint.

b. Nævus spilus appears in the form of flat or rugose eminences of a brown or black colour, extending over wide tracts of the cutaneous surface. The pigment is deposited in the rete mucosum and corium in the form of nuclei, granules, and crystals, which exist free or aggregated in the obsolete vessels. The papillary body and corium are also hypertrophied. This increase of pigment in the skin is frequently associated with internal deposits, especially in the brain and spinal cord, and likewise in the blood.

c. Nævus mollusciformis seu lipomatodes occurs as soft, wart-like, and dark tinted tumours, which are sessile or pedunculated (fibroma and sarcoma); these are either isolated, or aggregated in groups, forming larger tumours. In old people we sometimes find similar growths especially on the skin of the back and face; in these cases the coloration of the epidermis and rete Malpighii is usually normal whilst the cutis is pigmented.

Melasma, Melanoma, Melanosis, or *Nigrities*, is acquired coloration of the skin, which appears chiefly on the lower extremities, and may extend over the entire surface; it occurs mostly in wine-drinkers, as the result of pediculi and extravasations produced by violent scratching. This form of pigmentation is often met with in horses.

Ephelides, or *freckles*, are roundish spots of a light, or dark brown tint (varying in size between a pin's head and lentil) which occur chiefly on the exposed parts of the body, but also on other regions, as the back, chest and penis; they are paler in winter, darker in summer, the pigmentation being most marked at the apertures of the follicles. The parts of the skin devoid of freckles, are usually extremely white in tint from the absence of the pigment (uniformly distributed in the normal condition).

Chloasma, uterinum, lentigo, or *liver spots* (also inaccurately termed *Chloasma hepaticum*), occurs in women who suffer from disorders of menstruation, also during pregnancy, and the puerperal state. This affection is frequently associated with infarctions, fibroids, uterine polypi, and diseases of the ovaries; the skin of the forehead, eye-lids, cheeks, and upper lips being especially involved, and presenting dark-brown coloration. In males, chloasma also occurs as the result of long continued intermittent and malarious disorders, and in other dyscrasic affections, *e.g.*, acute tuberculosis carcinoma and melano-sarcoma. Increased deposit of pigment may also be due to the protracted action of the sun's rays, especially in a moist atmosphere, as in the tropics; and also in our climate in persons exposed to the heat of the sun, as field-labourers (*Pellagra*). Deposits of pigment occur also as the result of chronic skin diseases, as in prurigo, psoriasis, and eczema, as also scabies, syphilis, etc. The scratching is a very frequent cause; the phenomena being induced as follows:—the tearing of the vessels causes extravasation of a certain quantity of blood; or the colouring matter of the blood (hæmatin) is deposited in the tissues which being simultaneously penetrated by the hæmatoidin, fine granular masses are separated (minute nuclei and clumps). The melanine which is deposited as the result of burns, gangrene or new growths, originates in a similar manner. (*Weber*).

In many individuals the application of a mustard poultice is sufficient to produce a brown stain, which lasts a considerable time; wounds and ulcers frequently leave pigmentation of the skin. Such deposits, however, are distinguished from ephelis and chloasma by the presence of pigment not only in the rete Malpighii, but also in the corium.

The long continued internal use of nitrate of silver, and arsenic, induces dark pigmentation of the skin, which is evidently due to the deposit of these substances in the corium, and probably also in the cells of the rete Malpighii, in the form of albuminous compounds, which undergo further changes when exposed to the light. In Morbus Addisoni similar pigmentation is observed.

The parts around the pigmentary deposits are always of a lighter tint than the normal skin. The hairs occurring on the pigmented parts are usually of a dark colour, whilst those growing on the parts devoid of pigment, are colourless, or perfectly white. The senile skin also shows an essential increase of pigment.

In some cases pigmentary anomalies would appear to be related to trophoneurosis, the accumulation (*nigrismus*), as well as the absence of pigment (*albinismus*) being perhaps dependent upon disturbances of the trophical nerve centres (*Beigel*); in the above noticed diseases (typhus, intermittent, etc.), the changes in the coloration of the skin may be due to similar causes, just as affections of the nerves are frequently associated with other skin diseases.

Treatment. The removal of pigment is easily effected by such remedies as induce superficial inflammation of the skin, and consequent shedding of the epidermis. With this view a solution consisting of five grains of corrosive sublimate to one ounce of water, may be applied. The pigmented part of the skin is covered with accurately fitting pieces of linen, and is kept moist with the solution for three hours. The edge of the dressing must be continually torn away in order to avoid accumulation of the solution, which would cauterise the skin too deeply. Repeated painting with tincture of iodine, or a solution of iodized glycerine, and collodion sublimate, are also attended with similar results. The ointment consisting of *Magist. Bismut.*, *Præcipit. alb aa* ʒj. *Unguent simpl.* ℥ij., induces gradual shedding of the pigmented epidermis. Similar results are obtained by applying the concentrated acetic acid (which rapidly causes expansion of the epidermic cells), alone, or in conjunction with *Lac. sulf.* (rubbed into a paste); in the majority of cases, however, recurrence takes place.

As regards the treatment of nævus, remedial measures will be successful only in those cases in which the pigment is limited to the rete Malpighii, or where the pigmented, hypertrophied papillary body projects to such an extent that it may be completely removed by the scissors; this is frequently the case in nævus hypertrophicus, and especially in that variety known as "molusciformis." There are other cases in which recurrence rarely takes place; flat nævi, however, recur after the removal of the pigment. Small papillary growths are most suitably removed by the concentrated acids, especially by carbolic acid. The hypertrophied hairs are pulled out with the ciliary forceps, or the papilla is destroyed by galvano-caustic.

b. Decrease of Pigment.

This is either congenital or acquired; there may be deficiency of pigment, either on isolated parts or the entire skin. The congenital absence of pigment over the entire body is termed *albinismus universalis*: in such cases, the cutis, as well as the hairs (bulb and shaft), are devoid of pigment. The skin presents a milky white aspect, the hairs white, or yellowish-white, and the pupils red. This general absence of pigment occurs in European, as also in negro races.

The partial deficiency of pigment, *Alb. partialis seu Leukopathia* is also congenital: it is more frequent amongst negroes than in the Caucasian race. The hairs on the patches are white; such individuals resemble piebald animals.

The acquired absence of pigment (*chloasma album, achroma, vitiligo, leukopathia acquisita*), occurs in Europeans as well as in negroes. The affection is characterised by round white patches which are distributed chiefly on the extremities, genitals and on the face. The cause of the absence of pigment is in many cases obscure; sometimes it is induced by pressure, ulceration, etc. Partial discolorations are especially frequent after severe and weakening diseases, (*e.g.* typhus). In negroes the discoloration is of course most remarkable, from the piebald aspect thus produced. (Elster-neger, Negres pies, Negres mouchetès).

Albinismus partialis presents various conditions: in all cases there are white patches, which do not project above the surface of the surrounding skin, often symmetrically distributed. They are small and irregular, or distributed over extensive areas. The white colour also presents various shades, and is lustrous-snow-milk, blue-white, or without lustre; the parts most frequently involved are the genitals, hairy-scalp, beard, nipples, the back of the hand, and fingers; the white patches being usually symmetrical. As regards the hereditary nature of this affection, nothing positive is known; but there are undoubted cases in which partial albinismus has been transmitted over several generations. The hairs on the patches are usually white, but sometimes retain their normal colour; whilst in some cases white hairs may occur on parts which are not otherwise altered,—a condition which is to be regarded as partial albinismus of the hair, and is described under various terms (*leukosis, canities*). *Beigel* has described a variety occurring in the negro, which he termed *semi-albinismus, i.e.*, a coloration of the skin, between the normal black and white colour. Total and partial albinismus occur in negroes and Europeans, semi-albinismus only in negroes.

CLASS VIII.

NEUROTIC AFFECTIONS.

The neuroses of the skin are:—1. Disturbance of sensibility, *i.e.*, *a.* anæsthesia, *b.* hyperæsthesia. 2. Motor derangement. 3. Angioneuroses.

1. DISTURBANCE OF SENSIBILITY.

As is well known, the papillæ are the organs of touch, and their destruction is therefore attended with loss of perception of changes of temperature, and pressure.*

a. Anæsthesia. The causes of anæsthesia may be either in the brain, or in the course, or peripheral terminations of the nerves; thus opium, ether, chloroform and chloral induce anæsthesia by acting on the brain: the anæsthesia of elephantiasis Græcorum is due to affection of the course of the nerves, and local anæsthesia is produced by burns, wounds and the action of caustics.

b. Hyperæsthesia occurs in its marked form as itching or *pruritus*, a symptom which is associated with many skin diseases, as eczema and scabies. Itching is produced only by those conditions which irritate the papillary layer; whilst wounds and ulcers, which extend to the subcutaneous cellular tissue, produce pain without itching, the latter commencing only when the granulations become covered with epidermoidal cells. In prurigo—which some authors regard as a disease of the nerves, and others as a local exudation,—the itching is most severe only when new papules are being formed, and ceases with their destruction. In many dyscrasic diseases, as syphilis, lichen

* *Weber's* experiment on a deep ulcer of the skin gave the following results (Archiv. für physiologische Heilkunde, 1855):—on the destruction of the skin and fasciæ the muscles of the arm were exposed, and it was then ascertained that the sensibility to warmth was limited to the skin, and some parts of the mucous membrane. The muscles were less sensitive than the skin. The perception of touch and pressure was often lost; the distinction between a temperature of 0° and 40° was not recognised. After an interval of two days, granulations were being formed; 10° x 19° was not perceived, nor the pressure of ½-lb. weight. The impressions must, in fine, produce pain, in order to be perceptible. Two simultaneous impressions made longitudinally on the exposed muscles, were felt as a single irritation even when removed from one another by 10 centim.

scrofulosorum, and the exanthemata, there is no itching; whilst it is a marked symptom in urticaria and the epizootic affections. It would therefore appear that dyscrasic affections, which are due to blood-poisoning, are unaccompanied with pruritus, whilst the least local irritation gives rise to severe itching, this symptom being (as *Hebra* first showed), in most cases, induced by the local condition. Local and general pruritus, which are frequently connected with uterine physiological processes, are to be distinguished from prurigo, which never occurs without the formation of papules: thus women are liable to severe general pruritus, which continues during the entire period of pregnancy; further, itching is induced by morbid changes of the uterus, disorders of menstruation, also by morbus Brightii, hepatitis, and icterus; itching also frequently occurs during old age (*pruritus senilis*). Pruritus is frequent in young girls who suffer from disorders of menstruation, and is located chiefly on the extensor surfaces of the extremities, which are often marked with brownish-red crusts as the result of the scratching; the appearances resembling those produced by the bites of insects.

Pruritus genitalium occurs more often in females than in males; it is a frequent symptom in women, who are the subjects of amenorrhœa, sterility, and other ovarian affections, and also during the climacteric period. The itching involves the clitoris, the labia majora and minora, or the vagina; it is very intense at these parts and attended with sensual desires, and lasts from a few months to several years; as the result of the scratching (which may even induce masturbation) excoriations are produced, and at a later period chronic and infiltrated eczema and fluor albus. This variety of pruritus has been attributed to the presence of a fungus—the *trichomonas vaginalis*, but the observation has not yet been confirmed.

Pruritus ani occurs mostly in corpulent subjects, and is constantly associated with hæmorrhoids and intestinal worms, (ascaris, oxyuris); most frequently, however, the itching is induced by eczema intertrigo.

Pruritus senilis occurs in old age; the itching is then very severe without producing any other changes in the skin than those caused by scratching. The affection may be due to the senile involutions which we have already described.

The anatomical changes in the nerves, which occur as the causes or results of skin affections are rarely seen. *Langerhans* (Virch. Arch. 45 Bd. No. 413) has recently published his observations regarding the condition of the touch corpuscles in affections of the central nervous system, and of the skin, the results of which are negative. This observer found fine granular degeneration of the touch-corpuscles, in diffuse phlegmonous senile gangrene, and a yellow tint in icterus. *Meissner* observed fatty degeneration of the touch-corpuscles as the result of paresis.

2. MOTOR DERANGEMENT.

The condition of the skin termed *cutis anserina* belongs to this group; by the contraction of the muscular fibres (which begirt the base of the follicles), the hairs are erected, and the follicles protruded, in the form of minute papules (see my treatise on the muscles of the skin, Sitzungsber. d. kais. Acad., 1868). Similar phenomena are induced by the direct action of cold, or the electric current applied to the derma, also during the rigor stage of intermittent fevers.

3. ANGIONEUROSES.

This group includes those neuroses which originate in paralysis, as the result of which the nutrition of the parts is impaired; emaciation ensues, the hairs and nails fall off, or entire limbs become separated (see Elephantiasis Græcorum).

The relation subsisting between the majority of skin affections and the nervous system has been partly indicated in the preceding chapters (urticaria, herpes, albinismus, nigrismus, and alopecia). In recent times, *Eulenburg* and *Landois* (Wiener Medic. Wochenschrift, 1867-8) have contributed important observations regarding vasomotor neuroses (angioneuroses) which we shall here briefly record. These authors distinguish angioneuroses as traumatic and organic affections of the nervous trunks. If a nerve be injured or divided (as the larger nervous trunks of the extremities have sensory, motor and vaso-motor filaments) paralysis and anæsthesia ensue, as also dilatation of the blood-vessels and elevation of the temperature: in other cases, however, the temperature is lowered, and the skin may become gangrenous, especially as the result of an old injury. Atrophy of the affected parts may also supervene. Disturbance of innervation, and especially of the vaso-motor system,—is a frequent cause of skin affections, the arterial and venous circulation in the cutaneous glands being thus deranged. Thus anæmia and hyperæmia of the skin are dependent upon vaso-motor disturbance, induced in some cases by lesions in the brain and medulla oblongata, or by the action of cold and the electric current; anæmia is caused chiefly by contraction of the muscles and vessels. The derangement of the secretion of the cutaneous glands may possibly be influenced by the vaso-motor nerves, producing the so-called blood-sweats and anomalies of pigmentation. The poison of scarlatina, morbilli, etc., may act primarily on the vasomotor nerves, thus inducing the febrile symptoms, as well as the varied forms of eruption appearing on the skin (?).

According to *Landois* and *Eulenburg*, acne rosacea is merely a vaso-motor neurosis of the *nervus ethmoidalis*, as also the efflorescences which are produced by iodine, bromine, copaiva balsam, cubebs, cod-oil, quinine, digitalis, as well as those of malarious origin, since these appear either as acne, purpura, and furunculus, as also the erythemata, erysipelas, and urticaria. In this category also is included circumscribed local anæsthesia, in which the skin is marked by bluish-red patches, from the distension of the capillary vessels.

Herpes zoster may be regarded as a type of the angioneuroses: for, as we have already seen, *Bärensprung* attributes the origin of this disease to inflammation of the trophical filaments of the minute spinal ganglia. According to *Landois* and *Eulenburg*, this inflammatory process originates in the vaso-motor nerves: the supply of blood being augmented, the minute arteries become dilated as the result of which, serous exudation ensues (See Herpes zoster).

Urticaria originates as a circumscribed vaso-motor disturbance which may be induced by the most varied causes; and this applies also to lepra anæsthetica.

Treatment. In order to cure the itching, our treatment must be directed towards the removal of its cause, and this is readily accomplished in many skin affections, as eczema, scabies, urticaria, etc. In cases, however, in which it is impossible to remove the cause of the itching, our remedies alleviate the symptoms; and the employment of *cold water* in bandages, baths and douches, is all-important. The patient involuntarily resorts to *scratching* as a relief; for the pain thus caused is more tolerable than the incessant itching; the scratching probably acts in relieving the disordered circulation (*Hebra*); itching is also frequently allayed by pressure and friction. In the case of girls suffering from disorders of menstruation we employ the cold rain douche, and administer aloes and iron internally. In the pruritus induced by chronic metritis or diseases of the ovaries, the symptoms may be alleviated by the use of cold injections, and also by the introduction of astringent pessaries (consisting of alum, tannin or sesquichloride of iron), or opium and belladonna suppositories. Vapour baths medicated with hyoscyamus are also useful. When the attacks of itching recur at regular intervals, the administration of quinine is often attended with good results; as also the use of borax and aconitin (*Decoct. papav. alb.* ℥vi., *Borac. venet. Vin. colchic. aa* ℥j). As remedies for itching, some authors recommend the application of concentrated acetic acid, alcohol and *aqua Coloniensis*; in some cases these may be successfully employed.

CLASS IX.

PARASITIC AFFECTIONS.

The parasites which infest the human skin may be divided into two classes,—*animal* and *vegetable.*

A. Animal Parasites.

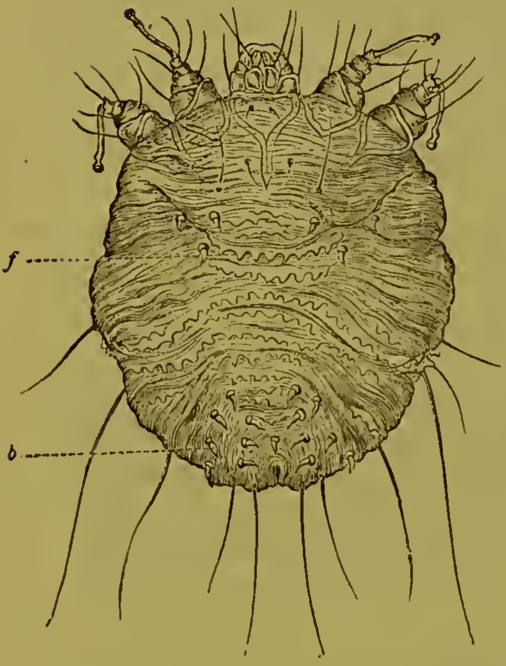
The animal parasites living in and upon the skin are the *Acarus scabiei* (*Krätzmilbe*) and the *Acarus folliculorum,* also temporarily the *Pulex irritans (Sandfloh), Filaria medinensis* (in certain stages of development), *Pediculi, Cimex* and *Acarus vicinus* (*Zecke*). We commence with the description of that important disease *Scabies,* or "the itch," which is produced solely by the presence of the *Acarus scabiei.*

1. SCABIES.

Scabies may be regarded as an artificial eczema, caused by the irritation of the itch parasite, and consequent scratching of the nails. The nature of scabies was first clearly indicated in a letter written by *Buonomo* to *Redi* (after a verbal communication by *Cestoni*); and the later researches of *Bourguignon, Gerlach, Eichstedt, Hebra, Küchenmeister, Bergh, Gudden, Fürstenberg* and others, have fully established the nature of the disease.

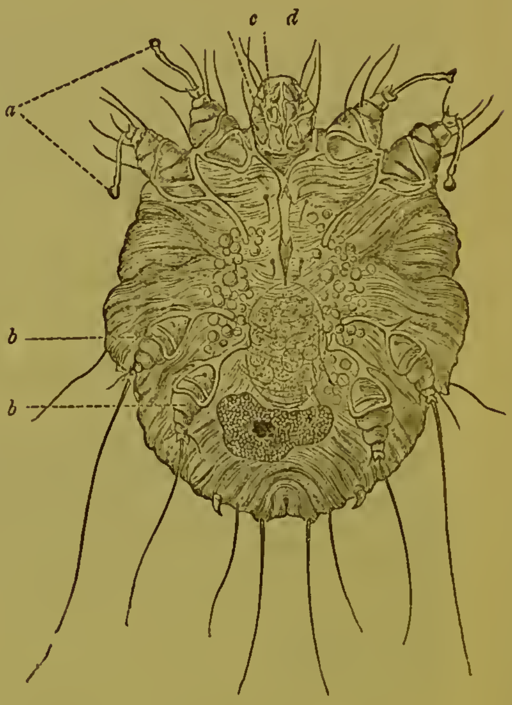
Anatomy of the Acarus scabiei. 1. The female acarus appears to the naked eye as a small roundish body (size $\frac{1}{3}$ Mm.) resembling a tortoise in shape; its average length is $\frac{1}{6}$-$\frac{1}{4}$, its breadth $\frac{1}{7}$-$\frac{1}{6}$'''. On microscopic examination, the upper surface displays more or less parallel lines, club-shaped processes and fine hairs (Fig. 42). On the lower surface in the full grown insect there are eight legs, the four front ones being provided with suckers, the four hinder-most with hairs (*b*). The head is implanted into the part between the anterior legs (Fig. 43). The mouth is bounded on either side by two pairs of palpi (*d*) which are provided with minute bristles; there are four mandibles (*c*) superimposed in pairs.

*Fig.** 42.



Female Acarus (from the back). *f*. Club-shaped processes.

Fig. 43.



Female Acarus (from the abdomen). *a*. Fore-legs provided with suckers. *b*. Hind-legs with bristles.

The alimentary canal is observed extending from the mouth. In the pregnant acarus, the ovaries may be seen filled with eggs, and granular masses. Respiratory organs would appear to be entirely wanting.†

2. The male (Fig. 44) is considerably smaller than the female acarus; the sexual organs are placed between the hinder feet. The female acari form long burrows in the skin; the males do not burrow, but get under scales and crusts.

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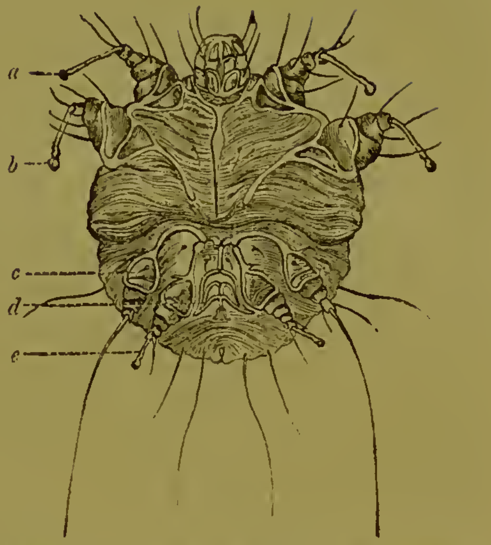
* The figures are from *Hebra's* and *Elfinger's* Atlas der Hautkrankheiten.

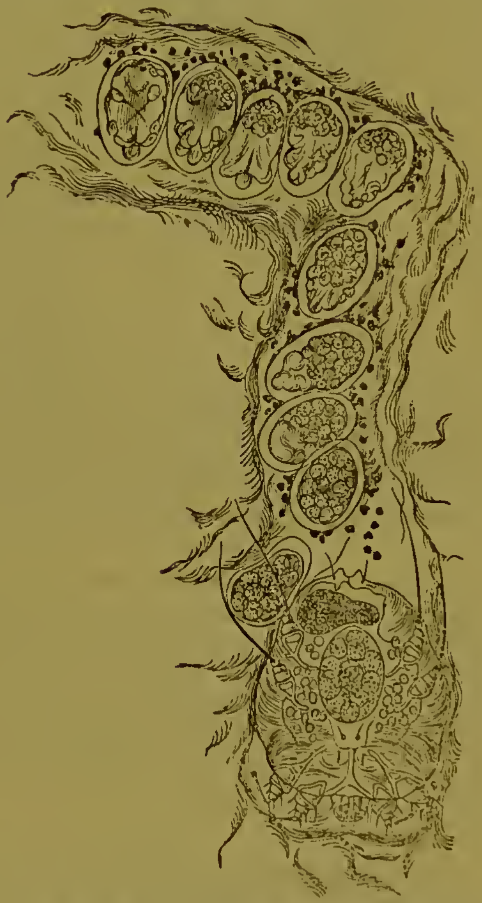
† Acari continue to live in parts closed to the access of the air, as in the skin, or when placed in petroleum oil.

Fig. 44.



Male Acarus (from the surface of the abdomen). *a.* and *b.* Legs provided with bristles. *c.* Suckers. *d.* Penis. *e.* Legs without bristles.

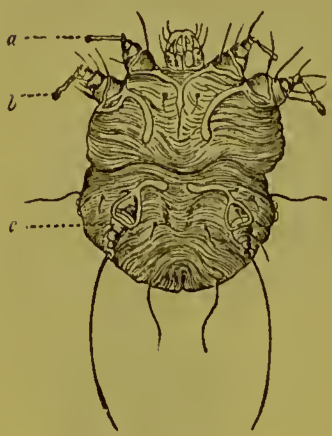
Fig. 45.



Scabies burrow (Milbengang). The eggs next to the acarus appear partly homogeneous, partly granular: those at a distance from the acarus contain embryos; at the entrance of the burrow the fully-formed acari may be observed.

In order to study the course of scabies, a pregnant female acarus is placed on the healthy skin. At first it is observed to move about in the furrows of the skin, and then settling, bores through the epidermis until it reaches the rete Malpighii, where it finds nourishment. The acarus (Fig. 45) burrows still deeper, depositing eggs during its progress, so that the cuniculus becomes filled. The eggs first deposited contain young acari, and are separated from the surface only by a thin layer, those last deposited being more deeply situated. The length of time which usually elapses between the laying and the hatching of an egg is about a fortnight. The number of eggs deposited by the acarus is very considerable; according to some authors, as many as 40, 50, or more, in a single burrow; usually, however, there are not more than 10 or 15 in a single cuniculus. The acarus dies when it has finished laying its eggs. The burrow thus formed appears to the naked eye as a tortuous line, varying in length from 1 Mm. to 10 Cm.; the acarus and the eggs usually appearing as minute white points. Sooner or later according to the duration of the disease and the sensibility of the skin, vesicles, or pustules, are formed beneath the burrow. Microscopic examination of a freshly deposited ovum, shows it to be filled with fine granular contents, which become organized; and in a few days an acarus is formed, which is seen to move about in the egg by the fourteenth day, and escaping from the shell, makes its way along the burrow to the surface of the skin. The young acari move about rapidly on the surface, and in penetrating the skin, cause the most violent itching. Some authors describe apertures for the admission of air into the burrow, but this observation is disputed. The young acarus (Fig. 46) has six legs, shows no indications of sex, and up to the mature state receives three coverings of skin. Whilst in the burrow the acarus lies motionless, and is closely surrounded by skin. When the skin is first shed the acarus acquires eight legs. The skin which has been broken through remains in the burrows. The life of female acari averages from three to four months.

Fig. 46.



Young Acarus. *a.* and *b.* Legs with suckers. *c.* Pair of legs with bristles.

The parts of the skin around the acarus burrow, present papules, vesicles, and pustules, the extent of the eruption varying according to the duration of the disease. In many cases the burrows are raised by underlying exudation, and are seen to extend over the papules, vesicles, and pustules. The itching (and consequent scratching) is caused partly by the contact of the acari with the papillary layer, and partly by the movement of the young acari on the surface of the skin. The burrows are laid open by the scratching of the nails, and the acari thus exposed; the efflorescence is thus destroyed, excoriations being formed, which are attended with severe itching.

As regards the mode in which the disease is spread, *Burchard* remarks that the patient does not exclusively scratch the parts at which the burrows are situated, but those at which the itching is most severe, and where he can conveniently use his finger nails. Thus, although the acarus burrows are most abundant on the hands, these are less frequently scratched than the forearms and thighs. The acari also migrate from one individual to another, and the disease therefore is transmitted less by the pregnant acari, than by those living outside the burrows.

The concomitant affection of the skin becomes more and more extensive and severe in protracted cases of scabies, thus confirming *Hebra's* view of the disease as an artificial eczema. The variety of the disease known as *Norwegian scabies* presents peculiar characters. In this affection, thick yellow accumulations of epidermis cover the palms of the hands and soles of the feet; at the same time the nails undergo degeneration and become detached. On other parts of the body, as the face, the pinna of the ear and the scalp, crusts (impetigo) appear, which contain quantities of dead acari and eggs (*Boeck*, *Hebra.*)

Although the theory of "itch metastasis" is now rejected as untenable, some authors still maintain that a poison (Krätzgift) is introduced into the system by the acarus; and that this poison, like that of syphilis, pervades the blood, inducing the secondary phenomena of the disease in the form of pustules and vesicles, at various parts of the skin. In negation of this view, the following observations may be adduced:—1. The inoculations hitherto made with the contents of scabies pustules (crushed acari), have been followed by the formation of a pustule, only at the point of inoculation. 2. In the case of scabies occurring on paralyzed parts, at which the papillary layer is less susceptible to the irritation of the acarus, we do not find the secondary phenomena, which would therefore appear to be caused by the scratching of the nails; for in such cases scabies burrows are also formed, and their immediate vicinity indicated by vesicles. 3. In scabies occurring in lunatics who are kept in strait jackets, and therefore unable to use their hands for the purpose of scratching, there are no excoriations. 4. It is scarcely possible to believe that a disease affecting the blood, would be completely cured in a few days by the mere application of an external remedy.

The special seats of the eruption of scabies are the hands, elbows, folds of axilla, nipples, scrotum, penis, buttocks and feet (especially the skin covering the internal malleolus). The affection, however, may be located on other parts, especially on those portions of the skin which have been subjected to the pressure of the clothing, as in women from the stays, and in men from belts. In people who carry loads on their backs the eruption will be located on the part subjected to the pressure. In many cases infants are infected by contact with the nurse, the eruption being located mostly on the skin of the chest, abdominal wall and extremities, also on the scalp and face. The itching of scabies is increased by warmth, the acari moving about more rapidly; hence the patients are tormented by the most violent itching when in bed during the night. The aversion of the acari to cold also explains the exemption of the face; for the hands, although exposed to the air during the day, are naturally approximated to the body at night, and from their warmth thus become the favorite seats of the acari (*Gudden*). Nevertheless it is difficult to account for the localisation of acari on certain parts of the body; in general they affect those portions of the integument where the epidermis is delicate, as that of the fingers, the inner surfaces of the arms and folds of the axilla, the penis and scrotum. The thinner the epidermis, the more rapid are the exudation and formation of papules; if the acarus finds food in the superficial layers, few papules are formed, their numbers being dependent on the depth of the burrows.

Diagnosis. The description already given will suffice for the diagnosis of scabies. In some cases, however, the appearances may be materially altered by the duration of the disease, the effects of various applications, as ointments, or by complication with other skin affections. The scabious burrows are usually most distinct on the hands and on the penis, appearing as white dotted lines. As the burrowed epidermis rapidly absorbs any colouring matter, the cuniculi may be variously tinted, black, red, blue, etc., according to the occupation of the individual. In the case of infants this diagnostic sign is wanting, as the burrows are not specially indicated by their colour, and are completely obscured within a few days by the pustules. The non-appearance of burrows, therefore, does not exclude the existence of itch. The secondary eruptions, however, afford more accurate data for the diagnosis, from their distribution on the fingers, palms of the hands, folds of the axilla, and especially on the abdomen and buttocks (in people who sit while at work); since the observation of a few cases will enable us to recognise the disease. In protracted cases of scabies affecting the legs, pustules (impetigo) are formed, accompanied with swelling of the crural and inguinal glands; such cases resemble prurigo in some respects, but are distinguished by the absence of the infiltration which characterises that disease.

Prognosis. The prognosis is favorable, as even the most severe cases of scabies may be cured within a few days by proper treatment; and recurrence rarely takes place without fresh infection. The clothes and unwashed bed-linen of scabious patients, contain crusts with living acari, and may therefore readily communicate the disease.

Treatment. In selecting our remedies for a case of scabies, we are guided by the following considerations:—1. By the age of the patient; 2. by the sex; 3. by the presence and extent of the secondary lesions; 4. by the circumstances (whether the patient is to be treated at home or in hospital). We propose first to enumerate those medicinal agents adopted in our own practice, and then other plans of treatment Amongst the numerous remedies which have been recommended in scabies, the best are those which not only destroy the acari and eggs, but also remove the secondary effects of the disease.

In the treatment of scabies, the following ointments are employed:—*

℞. Sulphur venalis ʒj.
Ung. simplex ℥j.
M. fiat ung.

Another formula is as follows:—

℞. Sulphur. venalis
Balsam. Peruvian. aa ʒij.
Ung. simplex ℥ij.
M.

In the "ambulatory treatment" for adults, *Weinberg's* ointment is useful:—

℞. Styrax. liquid.
Flor. Sulph.
Cret. alb. aa ℥ss.
Sapon. virid.
Axung. porci. aa ℥j.
M. fiat. ung.

The patient is rubbed with this ointment for three days in succession, and if there are numerous scabies burrows on the hands, gloves are worn during the treatment. In cases in which the secondary eruptions are extensive, the patient is rubbed with the following ointment, four times during 48 hours:

℞. Ol. Fagi.
Flor. sulph. aa ℥ss.
Sapon virid.
Ung. simpl. aa ℥j.
M.

The inunction is continued for about a week, after which the patient has a bath: in the case of children, flannel may be worn next the skin. In *Hebra's* clinique, the following remedies are employed in treating the scabies of adults; only in males, however, —the female skin being usually too susceptible for such methods:

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* It is scarcely necessary to state that remedies against scabies are no longer employed in the *gaseous* form (*e.g.* sulphur fumigations.)

1. *Solutio Vlemingkx*: R. *Calcis vivæ, libram; Sulph. venalis, libras duas; Coq. c. aq. font. libris viginti ad remanentium librarum duodecim*). This solution is suitable in the slighter cases of scabies. The patient is first placed in a bath and rubbed with common soap; then the solution is applied to the part of the skin affected with scabies. In applying the solution care must be taken to avoid injuring the skin, as the corium is easily exposed by too violent friction. The cure is usually effected by two applications of Vlemingkx solution. In more severe cases, in which the secondary eruptions are developed, *Wilkinson's* ointment (modified by *Hebra*) is advantageously applied:—

℞. Flor. sulph.
Ol. fagi aa ℥vi.
Sapon virid.
Adipis aa Oj.
Cretæ ℥iv.
M. fiat. ung.

The patient is rubbed with the ointment four times in forty-eight hours, and then clothed in flannel: or the surface may be powdered with starch (*Wertheim*). The ointment dries up and becomes detached in large lamellæ: about the seventh or eighth day, the patient has a bath for the first time.

Bourguignon's ointment is useful in practice among the higher classes, on account of its agreeable odour: the formula is:—

℞. Ol. Lavand
,, Menth
,, Caryophyll
,, Cinnamom aa ℈j.
Gummi Tragacanth ʒj.
Potass. carbon ℥j.
Flor. sulph. ℥iij,
Glycerine ℥vi.
M. fiat. ung.

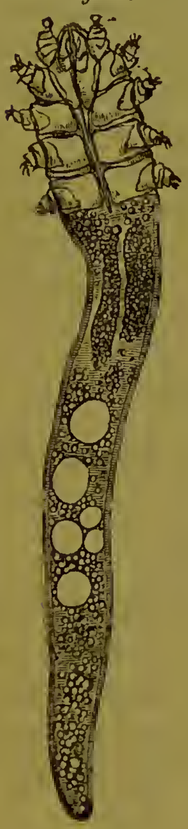
Amongst other remedies employed against scabies, the following require notice:—*Helmerich's* ointment, consisting of two parts of pure sulphur, one part of subcarbonate of potass, and eight parts of lard: *Alibert's* ointment, containing one ounce of flowers of sulphur, and two drachms of muriate of ammonia to two ounces of lard: *Valentin's* liniment (*Ol. amygdal.* ℥j., *Hepat. sulph.* ʒj., *Camphor* ℈j); solutions of bichloride of mercury (in pustular scabies of the hands); also the "*Spiritus Leonardi*" (R. *Potass. carbon. Pot.*

nitrat. aa ʒij. *spirit. frument. aq. font aa* Oss.) ; *Vesin's* ointment (R. *Flor. sulph. Sapon. alb. Adipis aa* ℥vi., *Pulv. Hellebor.* ʒij. *Potass. nitrat.* gr. x.).

Hardy's method of treatment is as follows:—The patient is placed in a warm bath, and rubbed with black soap, and afterwards with *Helmerich's* ointment. *Burchard's* treatment consists in washing the skin morning and evening with soft soap, and anointing with Peruvian balsam. *Decaisne* states that frictions with *petroleum* (three times in the day) will cure scabies : we have not had favorable results from this method. *Styrax* has been proposed as a remedy on account of its cheapness and rapid curative effects ; the eczematous condition of the skin, however, does not yield so rapidly by this method.

2. ACARUS FOLLICULORUM (*Haarsackmilbe*).

Fig. 47.



Acarus Folliculorum.

This animalcule (Fig. 47) occurs in the hair follicles and sebaceous glands (even in normal conditions of these structures). In length it varies from 0·085 to 0·125‴; breadth about 0·020‴. The head is provided with two lateral bi-jointed palpi, and a tubular proboscis, upon which lies a triangular organ, consisting of two bristles. The head is connected directly to the thorax, which constitutes about one-fourth part of the entire length of the animal. There are four short, conical legs on each side of the thorax, each of these organs being furnished with three finger-like claws. The abdomen is about three times as long as the thorax, and is composed of annular segments. In some specimens, however, the abdomen is smaller than the thorax ; and in some there are only three pairs of legs. As to the internal structure, some authors describe an alimentary canal and liver.

These animalcules exist even in the normal skin ; thus we are likely to find them in one or two out of ten persons, especially in those with a fatty skin. The usual seats of the parasite are the cutaneous follicles of the nose, face and ears. In one follicle there are usually not more than two, or more rarely four of these parasites, in exceptional cases, as many as ten or fifteen have been found; they retain their vitality for some time. The acarus folliculorum would seem to occasion no injurious effects by its presence in the skin.*

3. FILARIA MEDINENSIS (*Guinea-worm*).

This parasite penetrates the human skin, where it takes up its abode.

4. PULEX IRRITANS (*common flea*).

The bite of this insect is indicated by a dark spot, which is surrounded by an areola of redness: and when the skin is tender, even papules or wheals may be thus produced.

5. PULEX PENETRANS (*chigœ, rhynchoprion penetrans*).

This parasite occurs in some parts of Africa, America, (Paraguay Mexico), and the West Indies, being usually most abundant in the vicinity of human habitations. The chigoe penetrates the skin which then becomes inflamed: the impregnated female insect penetrates the epidermis and deposits its eggs. As the result of this irritation, the lymphatic glands become swollen, and abscesses or ulcers are produced. The parts most frequently attacked by this parasite, are the feet and hands: it enters the skin beneath the nails, or between the toes (*Karsten*).

6. IXODES RICINUS (*Holzbock*).

This parasite sometimes exists in pine wood: it penetrates the skin and produces small ulcers.

Parasites being temporarily on the skin.

a. The bug (*cimex lectularius*) is probably a native of the East Indies; it was known to the ancients, and valued as a charm against the bite of venomous snakes. The bite of this insect produces papules, or wheals, on the skin, which when scratched by the nails, present crusts (excoriations) of the size of a pin's head, resembling those resulting from pruritus cutaneus.

b. *Gnats* (*Gelsen*) *culex pipiens*, produce urticaria wheals.

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* The animalcules may be obtained in large numbers by squeezing a portion of the skin (as that of the forehead) between the fingers and a spatula: the mass thus extruded may then be moistened with a drop of oil, and placed under the microscope.

c. The *harvest bug* (*leptus autumnalis*) is a small red parasite which lives upon grain; it attacks the skin and produces wheals. In the autumn, field labourers are especially liable to be attacked by this insect, which is evidently identical with that (arachnide) described by *Gruby* (Allg. med. Zeitung 1863).

d. The *crab louse* (*phtirius inguinalis*, *pediculus pubis*) infests the hairs of the pubic region and extremities, as also those of the beard and eye-lashes. The skin at these parts is always more or less scratched by the nails, and a form of papular eczema may be thus induced.

e. The *head louse* (*pediculus capitis*) is limited to the hairs of the head, on which it deposits its ova; the irritation due to its presence, may induce severe eczema extending to the skin of the neck and face, with concomitant swelling of the lymphatic glands.

f. The *clothes louse* (*pediculus vestimenti*) infests the clothes of people of dirty habits; the changes thus induced in the skin, vary according to the length of time the lice have existed; if only for a short time, the swollen follicles appear as papules with superficial excoriations; after a longer period the excoriations are more severe, and usually linear in form, extending to the corium; and in some cases, pustules, boils, abscesses, and crusts are formed These eruptions disappear, leaving cicatrices, which are darkly pigmented in the periphery, and of a lighter colour in the centre than the normal skin. The most frequent seats of abscesses are the lumbar region and the shoulders, on those parts therefore where the lice are most abundant, *i.e.*, in the folds of the underclothing. As the result of the protracted irritation of lice, the skin acquires a dark-brown or slate-grey colour (*melasma*). The disease described as *ptheiriasis*[*] (*Läusesucht*) is therefore merely a local irritation depending on the presence of lice which exist only on the surface of the skin, and never find their way into the pustules or abscesses.

[*] *Phtheiriasis*, *Läusesucht*. In former times an opinion prevailed that the lice were produced by the "morbid humours" of the body, and that the boils and abscesses in the skin contained living pediculi: and authors have reported fatal cases of this kind (*e.g.*, death of the Emperor Arnulf, and of the Danish king Syno: see *Husemann* deutsche Klinik, p. 33, 1867). Until last century, these views of phtheiriasis prevailed, and even *Alibert* believed in the existence of the disease; *Devergie* also stated that mal-nutrition might lead to a spontaneous production of lice: even *Fuchs* accepted the theory of the spontaneous origin of "ptheiriasis" in cachectic subjects, and believed that in such cases lice existed in the boils on the skin.

Gaulke describes two cases in which he met with entire "colonies" of lice in *g.* The *tick* (*Zecke*) has a short head and white oval body; it penetrates the skin, and gives rise to considerable inflammation and swelling of the adjacent lymphatic glands.

Treatment. This consists first in the removal of the parasites; those beneath the skin (Pulex penetrans, Ixodes) are extracted by means of knife and forceps. There are various methods of exterminating pediculi: crab-lice are easily killed by rubbing in mercurial ointment, but care must be taken not to use a large quantity, else salivation may be induced. The excoriations are caused by the scratching, and are indicated by dark-brown roundish, or linear crusts. These excoriations are met with most numerously on the chest, back (between the shoulders), and on the loins. In some cases, boils and abscesses are also formed, and associated with swelling of the glands; and lastly, the skin presents dark pigmentation. These pigmentary deposits are either linear or, corresponding to the excoriations, round. The cicatrices are characterised by a whitish centre, and dark-brown periphery.

As local remedies, petroleum, carbolic acid (1 to 8), and Peruvian balsam, are applied; the balsam should remain for one night in contact with the affected parts. In order to effect the removal of the nits, and the prevention of eczema, luke-warm baths are advantageously employed. The best method of removing pediculi of the head is to cut the hair short, but in the case of women, as it is desirable to save the hair, the head may be dusted with Sabadilla powder, and repeatedly washed; pediculi vestimentorum are destroyed by exposing the clothes for some time to a high temperature. The secondary lesions induced by lice and other parasites are treated according to the method which we have already described.

B. VEGETABLE PARASITES.

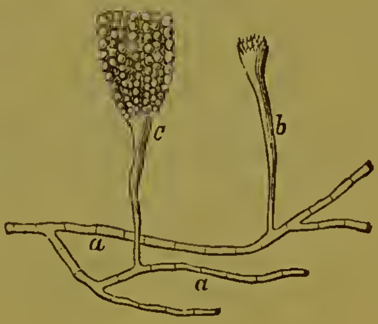
Part I.—General.

The great class of *fungi* is distinguished from the nearly related groups of *algæ* and *lichenes* by simplicity of structure, assimilation

cutaneous boils, which were covered with thin epidermis: he explains that the lice bore their way into the skin by means of a sting (Afterstachel) (?). *Hebra* justly refutes these statements; during ten years (at the Skin Clinique) we have examined most of the persons affected with pediculi, and have never yet detected lice beneath the skin (in abscesses, etc.) The morbid changes are solely produced by the irritation and scratching: the lice multiply rapidly, and by their bites produce intense irritation, and consequent formation of papules and wheals on the skin.

with organic substances, and (almost invariably) by the absence of the blue re-action with iodine and sulphuric acid. Fungi contain neither starch nor chlorophyll; nitrogen, however, enters largely into their composition. The *thallus* or so-called *mycelium* (Fig. 48 *a*) consists of simple, anastomosing, or cellular filaments, and is developed either in or upon the decaying organic substances which afford them nourishment, the organs of reproduction being produced at different points on the mycelium. In some fungi the mycelial filaments interlace freely, and bear various kinds of fructification; in others they form loosely interwoven tubular structures, or closely aggregated filaments and cells, which require a period of repose for their further development; the latter are termed *sclerotia* (Dauermycelien), as for instance in the *Secale cornutum*. Fungi are propagated by spores, and also by division of the cell-structure, *i.e.*, mycelial filaments (as in the simple algæ), and also by peculiar cellules, termed *conidia* (Fig. 48 *c*).

Fig. 48.

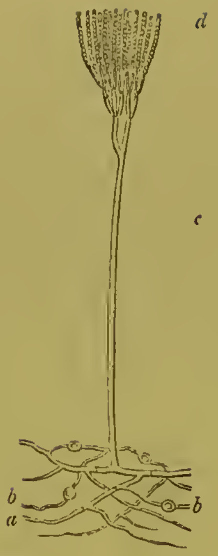


Aspergillus nigrescens (*Robin*). *aa.* Mycelium. *b* Hypha with sporidia at its upper extremity. *c.* Capitate group or conidia chain.

The term *hyphomycetes* (Schimmelpilze) includes several species of fungi which bear conidia formed (without previous fructification) on the erect filaments by a simple change in the form of the cells (Gliedzelle). The erect filaments of the mycelium, which bear the conidia, are termed *hyphæ* (Fig. 48 *b*). The conidia are attached to the extremity of the hypha (as in *penicillium*, Fig. 49) or in lateral chains (*fusisporium*, Fig. 53), or in capitate groups (*mucor*. Fig. 50), or isolated.

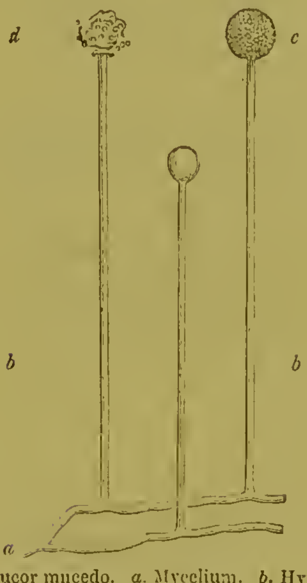
In some fungi the conidia are simple cells, as in *penicillium* (Fig. 49) and *aspergillus*, or cells divided by partitions (chambered conidia), as in *fusisporium* and *trichothecium* (Figs. 53 and 66). Although these various forms of conidia have hitherto been regarded as different genera and species by mycologists, such views are inaccurate: for these structures are neither seeds nor the products of fructification, but are rather to be regarded as the analogues of the leaf-buds in the Phanerogams. The propagation and increase of fungi are effected not only by the spores and conidia, but also, in some cases, by the individual cells of the mycelium, which become rounded and invested by a thick cellular membrane; these cells, like the conidia, increase, whilst the spores are destined

Fig. 49.



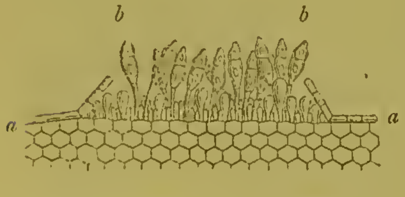
Penicillium glaucum. *a.* Mycelium. *b.* Macroconidia. *c.* Hypha. *d.* Conidia chain.

Fig. 50.



Mucor mucedo. *a.* Mycelium. *b.* Hypha. *c.* Sporangium. *d.* Conidia.

Fig. 51.



Puccinia graminis. *aa.* Mycelium. *bb* Conidia.

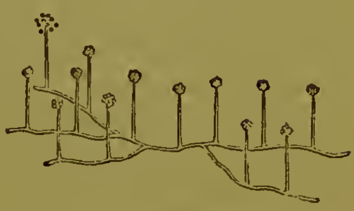
for the propagation of the typical organism (Artform); they are termed *macroconidia* or *chlamydospores* (Fig. 49 *b*).

In the group of fungi, termed *coniomycetes*, the conidia are thickly aggregated on the mycelium; these are distinguished from hyphomycetes by their occurrence beneath the cuticle of living or dead plants. This group includes the *uredo* and *puccinia* (rust fungi), which are so destructive to the corn (Fig. 51). If we place the myeelia, hypha, or conidia of *hyphomycetes* in pure water, or in a solution of sugar or salt, we observe the following changes:—the plasma, which was more or less clear, becomes turbid and granular, especially if the nutritive elements be unsuitable; within a short time proliferation of the granules ensues, at the expense of the cell plasma, until finally, according to the temperature, concentration, and nature of the fluid, they develop into *micrococcus, bacteria, oidium*, etc. In the same fluid mycelium may be formed, if the nutritive elements be favorable to the growth. As it is requisite for the study of mycology that we should have some knowledge of the organisms termed *micrococcus, bacterium, vibrio, spirillum, sarcina, leptothrix* (*mycothrix, Hallier*), *mycoderma* (*cryptococcus*), and *arthrococcus*, we subjoin a brief description of these structures.

a. *Forms resembling Bacteria.*

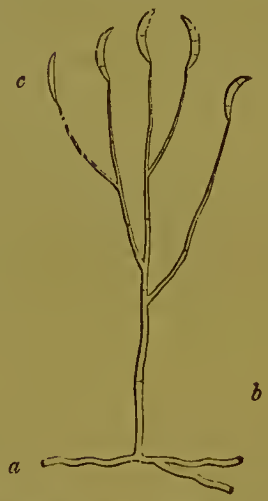
Joints or cells free, isolated, or grouped in chains, extremely minute.

Fig. 52.



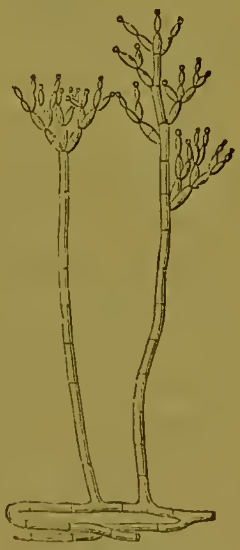
Cephalosporium.

Fig. 53.



Fusisporium. *a.* Mycelium. *b.* Hypha with ramifications. *c.* Conidia divided by partitions.

Fig. 54.



Cladosporium.

1. The cells, if isolated, are frequently at rest; if grouped like pearly threads (perlschnurartig), they exhibit movement. This group includes four varieties:—

a. Monas, Micrococcus (Fig. 55 1). Cells isolated, at rest or in molecular movement, multiplying by free daughter cells, and existing in all decaying animal and vegetable cells and fluids. They are regarded by some authors as the cause and vehicle of diseases, *e.g.*, the so-called *monas prodigiosa* (Hostienblut).

b. Bacterium (Fig. 55 2). Cells arranged in long or short chains, the terminal cells being frequently considerably larger than the others, giving the aspect of a drum-stick. They exist under the same conditions as the *micrococcus,* always exhibit molecular movement, and, in a fluid medium, present the appearance of a pendulum with the large end uppermost. Bacterium frequently occurs in fermenting milk and cheese; when placed in a fluid medium containing deficient nutritive elements, bacterium exhibits movement.

c. Vibrio greatly resembles bacterium; the cells are united in chains of nearly uniform size. In fermenting fluids, they exhibit extremely rapid movement, which is apparently voluntary.

d. Spirillium (Fig. 55 5). Cells united in spindle-like chains, which in fluids, exhibit rapid vibratile movements. They exist (not so frequently as the preceding forms) in fermenting and decaying fluids.

2. Cells united in cubical structures, at rest (*mœrismopœdia*). Mother cells containing four cellules (Fig. 55 4). The sarcina, which is frequently found in the stomach of men and animals, belongs to this group, as also the forms known as *moerismopœdia ventriculi*, consisting of jointed and aggregated filaments.

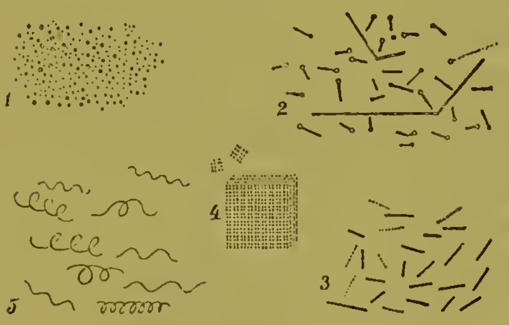
Leptothrix (*mycothrix, Itzigsohn*, Fig. 55 3). Cells united in simple and delicate chains, forming the so-called *cuticula*, which occurs chiefly on the surface of decaying and fermenting liquids. This form is not to be confounded with *leptomitus* which consists of the sterile anastomosing and delicate mycelia swimming in fluids. Under nutritive conditions favorable to their growth, these organisms may develop into :

b. *Forms resembling Oidium.*

Cells one hundred times larger than those of the preceding groups, multiplying by gemmation and ramified filaments.

Mycoderma (*cryptococcus, hormiscium, saccharomyces*). Cells roundish, elliptic, or oval, isolated or in ramified chains or branchlets, floccose, or resembling mycelia ; fully developed joints uniform ; growing in fluids.

Fig. 55.

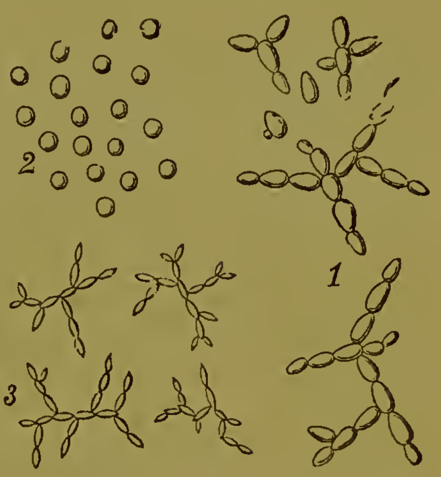


1. Micrococcus. 2. Bacteria with leptothrix filament. 3. Vibriones. 4. Sarcina. 5. Spirillium.

1. *Mycoderma cerevisiæ* (Bierhefe) presents two varieties : *a.* Beer ferment deposit (Unterhefe Fig. 56), which is formed in fluids during imperfect fermentation (temperature not exceeding 10° C) ; *b.* Beer surface-ferment (Oberhefe) which occurs in fermenting fluids, the temperature of which exceeds 10° C ; it consists of ramified chains formed by oval cells ; 2. *M. Hormiscium vini* (Weinhefe) ; 3 *M. aceti* (Essighefe) ; 4. *Gallus M. aceti* (Gallusgährungshefe) ; 5. *Arthrococcus* (Gliederhefe) *Oidium lactis* (Milchhefe, Fig. 57).

The oidium lactis, which is of special interest, presents the following characteristics: – The cells, cylindrical or oval in form, are united in ramified mycelial-like chains of variable length. When immersed, this organism may assume the mycodermic character, a mycelium consisting of cylindrical jointed filaments (from which branches extend into the air) being formed on the surface; the cells of this mycelium readily become separated. The *oidium lactis* resembling beer surface-ferment, may be developed from the jointed cells by placing them in a solution of sugar of milk, excluded from the air. In the true forms of *oidium*, *i.e.*, the so-called mildew, which frequently occur on living plants (*e.g.*, *oidium Tuckeri* of the well-known grape disease), clavate structures are formed by the cells composing the chain; this is not so apparent in the so-called oidium laetis. *Arthrococcus* (Gliederhefe) always occurs in fermenting milk and sugar of milk, when lactic acid is formed; the organism is recognized by its cylindrical cells.

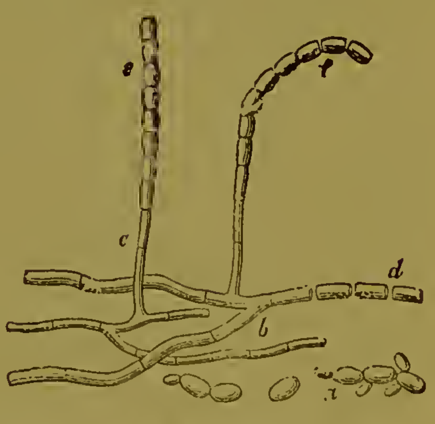
Fig. 56.



1. Beer surface-ferment. 2. Beer ferment-deposit. 3. Vinegar surface-ferment.

These various structures, which, as we have seen, resemble *bacterium* and *oidium*, are closely allied forms, being indeed convertible into one another, as *H. Karsten* has observed (Chemismus der Pflanzenzelle, 1869). These changes are effected by altering the nutritive fluid; thus, *micrococcus* or *bacteria* in beer-mash develop into *mycoderma cerevisiæ*; in solutions of sugar of milk, containing nitrogenous elements, into *oidium lactis;* in alcoholic solutions, into *mycoderma aceti;* the latter is directly convertible into *O. lactis*, and this again into *M. cerevisiæ*. We also observe the development of *sarcina*, *bacterium*, *vibrio*, and *leptothrix* from *micrococcus*, and *vice versa*. In these changes, the nutritive fluid, temperature, and air are doubtless important agencies, although we have not yet ascertained all the conditions necessary to the production of one or the other form. *Bail*, *Hallier*, and *Lüders*, state that these organisms are again convertible into *hyphomycetes* (bearing conidia). This view is partially admitted by *Hoffmann* and others, but has been totally negatived by several authors,

Fig. 57.



Oidium lactis. *a.* Separated cells. *b.* Mycelium. *c.* Hypha. *d.* Separated mycelial cells. *e.* and *f* Cells of hypha separating.

especially *Bary* and *Karsten*, the former of whom regards all these varieties, and also the different forms of *oidium* as independent species, whilst *Karsten* maintains that they are only transitory variations of the plasma (Bläschen) of the cellular tissues, which escape and undergo spontaneous proliferation. In the human skin certain fungus elements occur, the cells of which resemble those of *oidium* (especially *O. lactis*) in form and size, as well as mode of proliferation and growth. Thus in the hair-follicles and hairs, as also between the epidermic cells, we find the sterile mycelia of several varieties of *hyphomycetes;* these structures are altered by the nutritive matrix, by temperature, and other conditions. The interesting forms, known as *achorion, trichophyton,* and *microsporon,* would appear to be produced by the conidia and mycelia of *hyphomycetes,* which being deposited on the skin, undergo development and proliferation when the conditions are favorable to their growth.

e. *Forms resembling Hyphomycetes.*

These, unlike *oidium,* possess reproductive organs in the form of conidia, which, under favorable circumstances, propagate the organism. *Hyphomycetes* appears on the surface of the nutritive matrix, the air being necessary to its development; the simplest form of this organism is allied to the yeast fungi by the so-called *oidium lactis.* The forms of *hyphomycetes,* like those of *oidium,* are widely diffused throughout nature, their proliferation being independent of all except extreme climatic conditions; their development, however, may be modified by the nutritive matrix in which they exist. They invade both the animal and the vegetable organism, and are destructive in their effects (*e.g., aspergillus* in the ear and lung).

In recent times, it has been proved that several cutaneous affections are due to the presence of these vegetable organisms, on and in the human skin. As the result of an extended series of researches in regard to the parasitic conditions of the epidermic scales, hairs, and nails, I have observed that those fungi which are most widely diffused, produce like effects; there is no doubt, however, that the rarer fungi may also produce skin affections, as, for instance, *trichothecium,* which I found in eczema marginatum. The fungi existing in the epidermis present three different forms:*

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* The epidermic scales from the affected parts are treated with a solution of potash, and placed under the microscope.

1. Unchanged mycelial filaments (which very rarely bear conidia) anastomosing between the epidermic cells, showing the compact structure which characterises mycelium. In numerous cases I have observed them directly converted into *hyphomycetes.*

2. Cell structures of the *achorion* group including those oidium-like forms which present a roundish aspect (remotely resembling *M. cerevisiæ*), as in favus or herpes tonsurans. The number of these structures varies according to the extent of the diseased condition, the mycelia being in many cases entirely absent. Their development is often imperfect owing to the difficulty of supplying suitable nutritive conditions; they may indeed be destroyed by excessive cold or moisture, and then *micrococcus* and *bacteria* may be developed.

3. As structures resembling *micrococcus* and *bacteria.* These organisms are found in all decaying organic tissues, and therefore always in the cells of the epidermis invaded by the mycelia of fungi. Their growth is favored by moisture (blood, pus, etc.), and I observed that with their proliferation, the mycelial structures diminish; a fluid medium being favorable to the growth of the former, whilst the latter exist only on a moist surface. They occur very sparingly, or are entirely absent on dry parts of the surface. As the result of repeated observations, we believe that these organisms do not play an important part in the diseases with which they are associated.

The above-mentioned forms derive their origin from the most widely diffused *hyphomycetes,* and the frequency of skin affections, caused by their presence, is therefore easily explained by the fact that the causative fungi possess the greatest facilities for proliferation. Thus: 1. each mycelial cell may give origin to a new cell; 2. to chlamydospores bearing mycelia and sterile hyphæ; 3. to mycelia usually producing a considerable number of hyphæ which bear conidia; 4. to numerous conidia, each of which may give origin to a new mycelium with hyphæ. In *mucor racemosus,* for instance, we find the mycelium bearing numerous erect hyphæ, each of which is provided with one or more cups containing several hundreds of conidia; these again give rise to similar phenomena on decaying organic matters. As the forms of fungi are readily convertible into one another, the definition of the species causing the disease is immaterial. Thus, if *mucor* conidia be deposited on a matrix deficient in nitrogen, they give origin to *penicillium* instead of *mucor;* and several observers have demonstrated the convertible nature of *penicillium, torula,* and *aspergillus,* the form being determined by the nutritive matrix. The *mucor racemosus* is developed in all media, which are not too moist, as also the allied *penicillium glaucum* which is even more prolific. The *hyphomycetes* displays a cycle of changes in its development. *Mucor racemosus* and *mucor nigricans* are convertible into *penicillium*, and from a similar matrix *penicillium candidum* and *fuscum* may be developed after the first stages of decay.

In all such phenomena the degree of temperature and moisture plays an important part; exact observations are yet wanting, however, to determine the conditions under which *penicillium glaucum, torula,* and *p. candidum* are developed. When the conidia of *mucor* or *penicillium* are immersed in water, the various forms of *oidium*, as *M. cerevisiæ, M. vini, M. aceti,* and *O. lactis* are developed, and these again under certain conditions, are convertible into *micrococcus, bacterium, vibrio,* etc.

As the fructification of *hyphomycetes* (by hyphæ, bearing conidia) proceeds only when the growth is undisturbed, the human skin is therefore unsuited to their development *(Hallier)*. Hence these organisms rarely occur on the cutaneous surface, for the growth—even if it were to take place—would soon be arrested by the friction of the clothes; under these conditions, therefore, *hyphomycetes*, if once implanted in the human skin, can only develop in the form of sterile mycelia. The occurrence of *aspergillus nigricans* and other forms in the human ear and in the lungs, proves that the fructification of *hyphomycetes* takes place when there is a free surface for the development of the hyphæ.

In order to study these parasitic organisms, the scales, crusts, hairs, or nails, invaded by the fungus, are placed in a suitable apparatus and cultivated with a view to the development (and formation of conidia) of the mycelia and achorion-like cells. In such researches we must attend to the following essential conditions:—

1. The access of air is necessary to the rapid development of *hyphomycetes* and the production of conidia.

2. The degrees of temperature and moisture are important; the growth is favoured by a high temperature (about 30°), a moderate amount of moisture, and constancy of both conditions.

3. Organic matrix; thus, *micrococcus* and *oidium* are developed in fluids, in which *hyphomycetes*, of course, cannot exist.

4. Light is favorable to the growth of these organisms, although it is not essential to the development of many forms of *hyphomycetes*.

Etiology of Parasitic Skin Affections.

Moisture and warmth being favorable to the growth of fungi, people living in damp rooms, especially in newly-built houses facing the North, are peculiarly liable to become affected by herpes tonsurans; under these conditions, we may frequently detect, even by the odour, the presence of mould on the garments, linen, and bread. In a similar manner the prolonged application of poultices (especially if not frequently changed) may give rise to fungus growth; thus, on the parts surrounding wounds to which poultices have been applied, we sometimes observe a crescentic vesicular eruption. Again, pityriasis versicolor is frequently developed in people who perspire freely on parts subjected to the pressure of the clothing. Parasitic affections are frequently communicated by domestic animals, especially dogs; also from one person to another, either by direct contact or through the medium of the air; the latter mode of infection appearing chiefly in favus from the diffusion of particles of crusts in the air. The diseases are spread most readily amongst people living in small rooms, schools, etc.

Effects of Vegetable Parasites on the Skin.

The subjective symptoms, as itching, tingling, and other painful sensations vary in severity according to the particular disease (*e.g.*, in favus associated with ulceration, there is considerable pain). The objective phenomena, which are of much greater importance, vary according to the nature of the fungus growth. Thus, in *pityriasis versicolor* we find brownish spots located chiefly on the chest and back; in *onychomycosis* the nail becomes discoloured, thickened, and finally thrown off; in *herpes tonsurans* there are maculæ, vesicles, and scales, associated with a brittle condition and shedding of the hairs; in *parasitic sycosis* there is inflammation of the hair-follicles, producing pustules and infiltration of the skin; in *favus*, which occurs chiefly on the scalp, scales, and isolated crusts are first formed, and at a later stage the hairs become brittle, assuming a dull or "dusty" aspect, and are finally shed: from the pressure of the accumulated crusts, the integument of the scalp is destroyed, and subsequently replaced by thin cicatricial tissue, which remains permanently bald.

Extension of Parasitic Skin Affections.

As already stated, fungi would appear to be diffused chiefly through the medium of the air, as also by the clothing, etc., their growth being influenced by other conditions, such as cleanliness and habitation. In regard to the existence of fungi in the air, *Pasteur* has recorded interesting observations, showing that these organisms are more abundant in the air around human habitations.* *Bergeron* also has quoted statistics as to the frequency of parasitie skin affections.

When we consider that fungi exist so extensively in the air, the question arises—why are they not a more frequent source of disease? and in explanation, some authors state that individual predisposition is necessary to the growth of these organisms on the human skin. *Devergie* regards the growth of fungi on the human skin and on plants as analogous phenomena, and finding that in potato-blight the fungus growth is frequently most abundant when the disease is nearly extinct, he concludes that fungi are not the essential cause of parasitic affections. It has been sufficiently proved, however, by the experiments in regard to the germination and transplantation of fungi contained in scales and crusts, that the morbid changes in the skin are caused by these organisms, the growth of which is doubtless favored by the predisposition of the patient. Healthy people are as liable to *pityriasis versicolor* and *herpes tonsurans* as those who are delicate: *favus*, however, occurs mostly in poor, ill-nourished people, especially when cleanliness is neglected, for if the skin be frequently washed the fungus spores are removed before they have time to germinate. Hence the frequency of these affections amongst people living under conditions favorable to the development of the fungus growth.

Part II.—Special.

1. FAVUS (*Tinea vera, Porrigo favosa, scutulata, lupinosa, Achorion Schœnleinii, Erbgrind*).

This affection is characterised by the formation of pale, or sulphur yellow roundish crusts, which are concave on their free side, and convex on the attached surface, presenting the aspect of crab's eyes. These crusts are seated upon depressions of the derma, corresponding to their thickness, and are recognised by their peculiar "mousy" odour. When the crusts are isolated, the affection is termed *favus dispersus*, when confluent, *favus confertus*. At first, the disease somewhat resembles *herpes tonsurans* (in its later stage) in the appearance of the thin, roundish scales, each of which is perforated by a hair; presently, however, minute yellow specks appear in the centre of the scales, which rapidly enlarging (to the size of a lentil) assume the characteristic aspect of favus crusts. On the protraction and extension of the disease the characteristic cups disappear, leaving irregular masses of crusts which present a friable surface. On detaching a favus crust, we observe a cup-like depression in the cutis, which is either covered with thin glistening cuticle, or denuded of epidermis (ulcerous); the excavation is caused by the continued pressure. When the disease has lasted some years, the loss of substance resulting from the ulceration, is usually repaired by thin cicatricial tissue, which is firmly adherent to the bone. The hairs traversing the favus crusts lose their lustre, and assume a dull, dry, and colourless appearance. They undergo degeneration, and look as if they were covered with fine dust. They are brittle, also twisted or split longitudinally, and more easily extracted than healthy hairs. Favus is most commonly met with on the scalp, and is accompanied with irritation of the skin, which is followed by muco-purulent exudation and suppuration. The disease may also occur on other parts of the body, appearing primarily as minute circles of vesicles (Bläschen, "herpetisches Vorstadium") which develop into yellow crusts, *favus scutulatus* (*Köbner*).

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* See *Pasteur's* Researches, Comptes rendus de l'Academie des Sciences.

The existence of fungi in the crusts was first demonstrated by *Schönlein* in the year 1839, in the hairs by *Gruby* and *Wedl*. *Remak* was the first who succeeded in transplanting favus crusts to his arm, so as to produce the disease; he supposed, however, that a special "predisposition" was necessary to infection, and this view has been shared by many others, and, although too exclusively adopted, we partially admit its correctness (Diagn. and path. Untersuchungen in der Klinik von Schönlein, Berlin, 1845).

Vogel, for instance, states that favus is always preceded by a scrofulous exudation; *Stiebel* regards favus as a scrofulous deposit (Schlacke); according to *Neukranz*, tubercle and favus are identical. Several French dermatologists still partially adopt these views: thus *Cazenave* believes that the fungi appear subsequently in the sebaceous masses, and *Devergie* that they are only chance products (Zufälligkeiten). In regard to the nature of the *achorion* (discovered by *Schönlein*) there have been conflicting opinions.

Robin (Histoire nat. des vegetaux parasit., qui croissent sur l'homme et les animaux vivants, Paris 1853) classes favus amongst the *oidia*, (genus, *achorion*). As the result of the clinical observation,* that favus or herpes tonsurans frequently appear on parts to which bandages and compresses have been applied, —*Hebra* attributes all the vegetable parasitic affections to the presence of one fungus: and this view was confirmed by the simultaneous occurrence of favus and herpes tonsurans on different parts of the body. According to *Hebra*, pityriasis versicolor is produced by the same parasite at an earlier stage of development. *Hutchinson* has advocated similar views.

Stark observed that herpes tonsurans is developed on parts at which favus has been inoculated, and that the vesicles of the former reassume the aspect of favus.

Pick also regards the fungi of favus and herpes tonsurans as identical. (Verhandlungen der Bot. zoolog. Gesellschaft, 1864), as he found that inoculation with favus matter produces sometimes the one, and sometimes the other disease.

Hallier first tried the effects of direct inoculation with favus matter; he deposited the favus crusts on slices of apple, lemon, and other juicy fruits, also in blood, albumen and glycerine, and observed the direct development of the fungus (penicillium glaucum) from the achorion. Although *Hallier* at first believed that favus and herpes tonsurans were derived from penicillium, he was led by further observation (Gährungserscheinungen) to the opinion that herpes tonsurans is produced by the aspergillus (Pflanzl. Parasiten des menschl. Körpers.)

These statements as to the identity of the fungus in several skin affections, have been disputed by *Bärensprung* (Annal de Charite, Berlin, 1855); this observer, however, has not attempted to confirm his views by direct experiments.

Strube (Dissert, 1863), *Köbner* (Klin. und exper. Meitheilungen Erlangen, 1854) found that by inoculation with favus crusts, only favus was produced, and with herpes tonsurans only that affection. *Köbner* states that the development of characteristic favus is preceded by herpetic vesicles, which however are larger and more persistent than those of herpes tonsurans. Similar results were also obtained by *Peyritsch* (Jahrbuch der k. k. Gesellsch. der Aerzte, 1869).

Experiments similar to those of *Hallier* (by direct inoculation of favus) have also been instituted by *Karsten*, *Hoffmann* (Bot. Zeitung, 1867), *Baumgarten* (St. Louis med. and surg. Journal 1868), *Köbner* and *Peyritsch*, the results, however, are at variance. Whilst *Hallier* and *Baumgarten* regard the fungus as penicillium, *Hoffman* as mucor, and *Lowe* as aspergillus. (On the identity of Achorion Schönl. and other veget. paras. with Asperg. glauc., Annal. and Mag. nat. Hist. 1857), *Köbner*, *Peyritsch* and *Karsten* believe that the penicillium or other similar fungi are merely chance accretions which have nothing to do with the favus. The direct transplantation of fungi to the skin has been tried by several observers, but with varying results. Whilst *Hallier* and *Pick* produced the "herpetic stage" of favus by the transplantation of penicillium on the human skin, *Hallier* obtained favus itself, and *Zwin* (Bair. Intelligenzblatt 1868) inoculated the disease in rabbits; *Köbner*, *Peyritsch* and others never effected successful inoculation.

Hallier believes that the penicillium glaucum is more likely to vegetate on the skin than the other varieties from its greater capability of acclimatisation. I have frequently observed that the nature and aspect of the fungus are modified by the nutrition, change of temperature and amount of moisture. *Ardsten* describes a puccinia favus (Fig. 58) which, however, is merely a chance product (*puccinia gramminis*).

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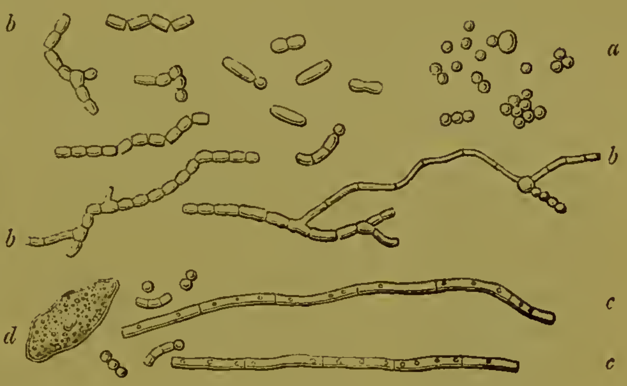
* Zeitschrift der Gesellschaft der Aerzte, 1854.

Fig. 58.



Fresh favus crust (treated with water). *a.* Isolated, roundish, and cylindrical conidia, arranged in groups or chains. *b.* Achorion. *c.* Mycelia. *d.* Epidermic cell with micrococcus and bacteria.

When a favus crust is broken up (treated with water) and examined microscopically, it is found to consist of a vegetable matter in the form of minute roundish bodies (*a*); which appear singly between the epidermic cells and in the hair-follicle, or in little groups (*b*); also of numerous elongated, branched and jointed cells, which resemble certain forms of *oidium lactis* (as seen in sugar of milk and tartar) which, like the favus cells, readily develop into true oidium, in solution of sugar of milk. Besides these there are chains of conidia loosely united together. We also frequently meet with true mycelia (*c*), composed of transparent ramified filaments, which are not easily broken up into their component parts. Lastly, *micrococcus* and *bacteria* are invariably found in the exfoliated epidermis. The hairs present similar conditions (Fig. 52); they exhibit the changes described by *Gruby and Wedl* only in the later stages of the affection. On examining the hairs (which have been soaked for a short time in a weak solution of caustic potash and washed) they are seen to be permeated by abundant fungus elements extending longitudinally between the fibrillæ. These spores are similar to those which have been described as existing in the favus crusts: they are usually observed in longitudinal chains in the interstices of the fibres, where we also meet with *oidium lactis* in considerable number, and also isolated conidia.

Fig. 59.

Favus hair (treated with solution of potash). Cortical substance, split longitudinally with mycelia (*Wedl*).

The root sheaths also are interspersed with single and aggregated conidia. With *Hallier*, I regard the *achorion* as a morbid development of the *penicillium;* but I only observed that by culture the achorion produces branching filaments which do not bear conidia. The *penicillium,* however, was developed from the unchanged conidia and mycelia (after ten or twenty days' incubation) by supplying them with suitable nutritive material. The results of my inoculation of *penicillium* in the human skin were unsuccessful.

Prognosis. Favus is curable, but requires long-continued treatment in order to eradicate the fungus-elements which readily adhere to the skin and hairs.

Treatment. The treatment of favus is purely local. In removing the crusts the barbarous method of the *callotte* is no longer practised: it consists of pitch-plaster spread upon strong cloth, which is applied to the scalp and forcibly removed. The method of removing the crusts is by the application of oil, which causes them to lose their attachment to the skin, in from twelve to twenty-four hours. After the removal of the crusts, the hairs are pulled out, the affected part being then rubbed daily with potash soap, and the scalp covered with strips of lint soaked in a solution of carbolic acid, (*Acid. carbol.* ʒj. *Glycerin.*, *Alcohol aa* ℥j. *Aq. destill.* ℥vi.) or petroleum. This method (adopted by *Hebra*), is always preferable to the frictions with turpentine, or with croton and olive oil. *Walter* treats favus without epilation, by applying a mixture consisting of one ounce of sulphuret of potash to one pound of potash soap; this is rubbed into the skin two or three times daily; the affected parts are then covered with cloth which is kept moist; the hairs are cut short. *Locher* recommends sulphuret of lime. Other remedies are lotions, consisting of corrosive sublimate and alcohol, or benzoin, or the inunction of *unguent. Veratrin:* also lotions and ointments of acetate or sulphate of copper, iron, acetate of lead, calomel, iodide of sulphur, sulphuret of potash, manganese and carbon: ammoniac plaster (1 part *gumm. ammon.* 3 parts *acet. vini.* boiled and evaporated to the consistence of honey) applied in strips, and removed in two or three days.

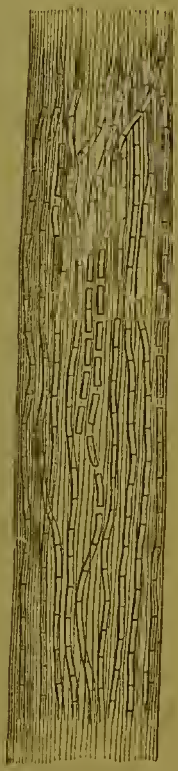
2. HERPES TONSURANS.

H. circinates (*Bateman*) *Trichophyton tonsurans*, *Porrigo scutulata*, *Tinea tondens* (*Mahon*) *Trichomycosis*, *Ring-worm*, (*Plumbe*), *sheerende Flechte.*

This affection occurs as well on the non-hairy parts of the skin, as on those provided with hair, presenting the following varieties: 1. *vesiculosus*, 2. *maculosus*, 3. *squamosus* (which is only a later stage of the two first forms).

Herpes tonsurans vesiculosus commences with the development of circles of minute vesicles which become desiccated within a few hours, leaving thin scales and crusts; the eruption extends circumferentially by the formation of fresh vesicles, the centre being covered by thin scales. These circles may coalesce, forming curved lines as in psoriasis.

Fig. 60.



Fragment of hair from a case of herpes tonsurans (*trichophyton*) displaying jointed conidia and numerous chains of spores.

Herpes tonsurans maculosus occurs in the form of pale spots, the centre of which is marked by a minute whitish scale; the eruption extends from the periphery, whilst the centre fades, as in erythema annulare.

Herpes tonsurans squamosus presents thin scales, mostly grouped in circles; it occurs on non-hairy parts, as the last stage of the two preceding forms.

In herpes tonsurans affecting the scalp, the hairs on circumscribed patches break off or fall out, and the surface is covered with thin, loosely attached scales or crusts. The fungus (trichophyton) is observed between the epidermic scales, as also in the hair and root-sheaths. As the disease advances the hairs become brittle, dull, and inelastic, and at the points where they are broken off, display a fibrous or ragged aspect.

Etiology. The development of herpes tonsurans is favored by various conditions, such as warmth and moisture. Hence the disease is frequently induced by the protracted application of wet bandages (especially if not kept clean), as in cases treated hydropathically; and even ulceration may be induced by similar causes. The affection is very common in children, and is frequently transmitted amongst all the pupils attending a school. People living in damp houses are liable to herpes tonsurans, and in such cases we may frequently detect the presence of mould (Schimmel) on the garments, linen and bread. The disease is sometimes communicated by domestic animals, especially cats, dogs and horses.

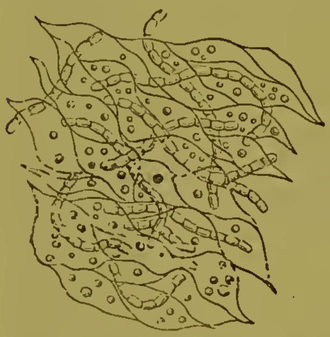
As is well known, *Malmsten* was the first to detect the presence of fungi in the hair; he points out their resemblance to *torula olivacea* or *abbreviata* (Harskarande Mogel, Stockholm, 1845). *Hebra* also found the fungus between the epidermic cells, and regards it as identical with that of favus, as the two affections have been observed to occur simultaneously, favus crusts being sometimes preceded by herpetic efflorescences (Zeitschrift der k. Gesellschaft der Aerzte, 1854).

Köbner inoculated himself (and also animals) with *trichophyton*, and there resulted only *h. tonsurans*. He states, moreover, that favus is preceded by an herpetic stage (herpetisches Vorstadium) which resembles *h. tonsurans*, but is distinguished by the smaller size of the rings, the cups of favus being uniform in size and perforated by hairs ; *h. tonsurans* extends in breadth, *favus* in depth.

Hallier regards *trichophyton* as a development of the conidia chains of *penicillium* ; in a later work (Gährungserscheinungen, 1869) he states that this fungus is a form of *oidium* at its highest development, *i.e.*, a *torula* chain derived from *aspergillus ;* the spores are the products of *ustilago* (Staubbrand vom Brandpilz).

On adding a solution of potash to some of the scales from herpes tonsurans, we observe globular or rarely cylindrical cells, some of which contain daughter cells ; these are isolated or aggregated. More frequently, however, we meet with delicate anastomosing mycelial filaments containing clear plasma. In the hair-follicles, root-sheaths and also in the hairs themselves, fungi are distinguished, appearing in the first as conidia chains, some of which develop into tubes.

Fig. 61.



Herpes tonsurans: disjointed and isolated conidia between the epidermic cells.

The results of my experiments confirm the clinical observation of *Hebra* as to the origin of H. tonsurans and favus from one organism, *viz.*, *penicillium.* In some cases, however, as will be shown, I also demonstrated *trichothecium* as the cause, and never succeeded in obtaining aspergillus from the fungus growth in herpes tonsurans.

Treatment. Herpes tonsurans, even if it has existed for a long period, is cured by the following methods. In slight cases frictions with potash soap, and if the affection be extensive, the soap is allowed to dry on the skin (soft soap cure). The application of *spir. sapon. alcalin.* is useful. In cases in which the disease has produced infiltration of the skin, the parts are first freely rubbed with soap, and then treated with tar. Amongst other remedies, we may mention lotions consisting of benzoin, borax, petroleum and Peruvian balsam, or carbolic acid.

3. ONYCHOMYCOSIS.

This term is applied to a parasitic affection of the nail substance, attended with the following changes : the nail is usually curved claw-like, and thickened at its anterior border, its surface being uneven and dirty-yellowish in colour; the entire nail is loosened from its bed. The surface is marked by transverse fissures of a lighter colour, and by yellowish stains. The nail-substance is friable, and splits in lamellæ, or crumbles. In the few cases which have been observed, the nails of the toes, as well as those of the fingers were affected, and the disease was associated either with favus of the scalp, or with herpes tonsurans. It would appear that, as the result of scratching, the scales or crusts from the affected parts of the skin, are taken up by the nails; if the conditions be favorable, the fungus undergoes development, and produces the morbid changes in the nail substance. As the growth of the fungus in the nail is extremely slow, it may happen that herpes tonsurans or favus may have run its course on the parts from which the nails have been infected, whilst the onychomycosis still continues.

On microscopic examination of the brittle masses, or solid nail substance, we observe ramified conidia chains, with distinct nuclei; and also isolated cells. The last joints of the chains are sometimes club-shaped. In regard to the nature of the fungus, authors are still at variance. *Virchow* (Arch. ix. Band) describes a dense net-work with broad filaments, which terminate in minuto chains of oval spores; he also found umbel-like structures. He concludes that the different botanical and clinical features of the disease point to achorion and herpes tonsurans. The fungi are related to *botrytis, peronospora,* and *penicillium. Bärensprung* identifies onychomycosis with herpes tonsurans; *Küchenmeister* and *Hallier* with achorion; *Köbner* describes two cases, which he classes with herpes tonsurans, and delineates round cells with short chains, which sometimes become club-shaped, or ramified, or terminate in thin filaments bearing several elliptical conidia. In one case, *Köbner* observed a puccinia.

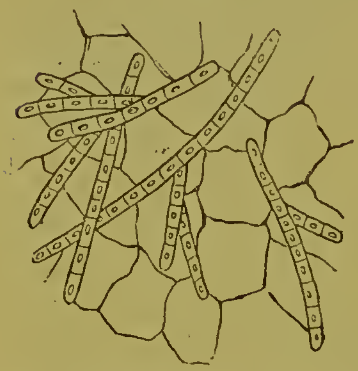
On examining a section of the affected nail, the substance is seen to be traversed by short-jointed, ramified, and slightly compressed fungus filaments, each joint of which usually displays a nucleated cell in the centre; between the cells of the nail-substance also, we observe isolated or aggregated roundish fungus cells, most of which contain minute daughter cells ("plasma molecule," of many botanists); in some specimens with elongated or oval cells (somewhat resembling arthrococcus) containing two or more nuclei. These cellular filaments are firmly jointed, and even after maceration, they may be moved about (by the pressure of the covering glass) without dismemberment; hence, we must regard them as mycelial threads. There are no special accumulations of *micrococcus* or *bacteria* on or between the cells of the nail-substance. In cases in which the mycelia are less numerous they are rendered distinct by macerating the sections in a solution of potash (1·10).

Treatment. This consists in removing the lamellæ of nail-substance, which are readily detached by applying solutions of caustic potash, corrosive sublimate (gr. ij., *ad.* ℥j.) ; or *Ol. Terebinth.*

4. PITYRIASIS VERSICOLOR (*Microsporon furfur, Kleienflechte*).

This affection appears in the form of yellow or brownish spots, chiefly around the apertures of the hair-follicles; it occurs on the chest, back, neck, and arms, more rarely on the lower extremities, and still more so on the face. The eruption extends from the periphery, sometimes healing spontaneously in the centre, and gradually spreading at the circumference. When the affection has lasted some time, diffuse patches entirely cover the skin of the chest. The scales are detached by the scratching of the nails, and thus we are enabled to distinguish the affection from the pigmentary deposits in *chloasma uterinum.*

Fig. 62.



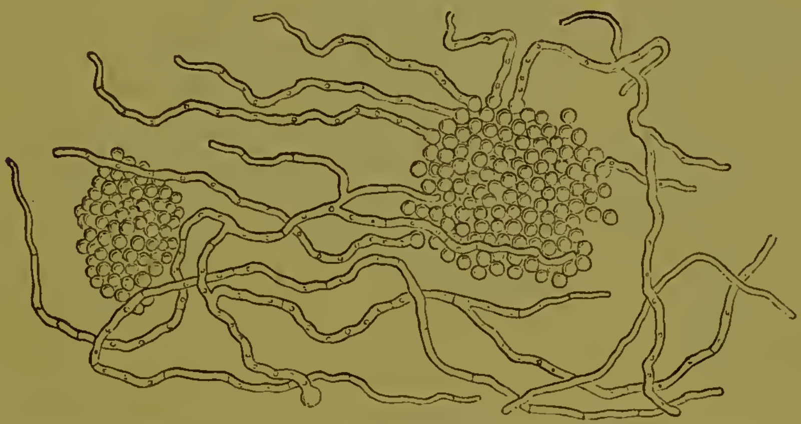
Section of nail affected by fungi, with numerous conidia.

The affection never occurs in infants, and rarely in old people; it is most frequent in young persons, especially in those who perspire profusely, and neglect cleanliness. On microscopic examination of the detached scales, we observe roundish groups of conidia more or less numerously distributed amongst the epidermic cells; these conidia have a distinct contour, and are filled with a clear or slightly granular plasma; and they are mingled with short, ramified, and tubular filaments (without joints) in considerable number; in their development they resemble the beer ferment deposit. Some observers erroneously represent these conidia groups as invested by a common membrane, and as a sporangium with free conidia and radiating cell filaments (*Hallier*).

Eichstedt (Froriep's Notizen, 1846) was the first to discover a fungus in this affection; *Köbner* (Exper. Mittheilungen, 1864) succeeded in transplanting *microsporon* to his own skin, as well as to that of rabbits; *Hallier* derives the fungus of *pityriasis* from aspergillus; as the growth of this organism is favored by a dry soil, it develops freely in the layers of the epidermis, appearing in the achorion form of *aspergillus* (Die pflanzlichen Parasiten des menschlichen Körpers, 1866, page 79). *Hallier* obtained all the degrees of development of *aspergillus* by macerating pityriasis scales in water for a year; he also states that *microsporon* grows as well in glycerine. From later researches, however, *Hallier* classes the pityriasis fungus as a *stemphylium*, which is obtained by culture on starch-paste, being derived from *aspergillus, eurotium*, and *ustilago*.

As the development of the microsporon cells is extremely slow, their growth and decay may be distinctly observed. In tracing the proliferation of a small group, I observed in some the development of daughter cells (usually two from one mother cell), a few of which, after separation, assumed a tubular form. In other cases the cells became tubular; in others, again, enlargement of the microsporon cells, followed by production of daughter cells, and lastly the membrane and cell group decayed, *micrococcus* and *bacteria* replacing the original microsporon cells.

Fig. 63.



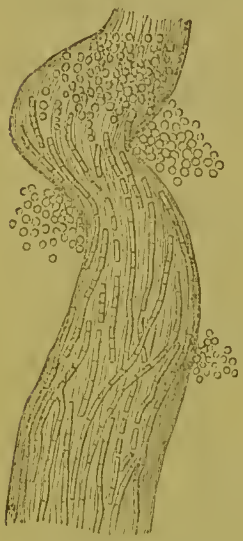
Pityriasis versicolor (after 14 days). Groups of conidia with tubular filaments.

The treatment is similar to that of herpes tonsurans.

5. SYCOSIS PARASITARIA (*Parasitäre Bartfinne*).

According to *Bazin* and *Köbner*, this affection is developed from *herpes tonsurans barbæ*, although the latter disease is not always followed by sycosis. This variety of sycosis is distinguished from the non-parasitic (*folliculitis barbæ, Köbner*) by the following diagnostic indications: parasitic sycosis commences in the hairs, whilst in the common form of sycosis they are only involved when the exudation in the hair-follicle has become purulent; in the common form of sycosis the subcutaneous tissue is always involved, very rarely, however, in parasitic sycosis; in common sycosis, the morbid process may remain limited to a small area for months or years, whilst the parasitic form extends rapidly (*Köbner*). In 85 out of 100 cases, parasitic sycosis is preceded by herpes tonsurans, whilst the non-parasitic variety appears in the form of papules; in the former the focus of infection (Infection sherd) is usually traceable, and no recurrence takes place after the cure has been effected, whilst in the latter the disease frequently reappears (*Köbner*). In Austria, parasitic sycosis is a rare disease, for although I have had ample opportunity of observation, I have only met with two cases, in one of which the disease was communicated by a dog*, in the other by a horse (both of which were affected with herpes tonsurans). As I was concluding this work, Dr. During, of Philadelphia, kindly sent me a few hairs (vide Fig. 64) from a scycosis patient in the St. Louis Hospital.

Fig. 64.



Hair (from Dr. During's patient). Conidia in groups and chains on and between the fibrillæ.

Treatment. The treatment is similar to that of favus. Epilation is all-important.

6. ECZEMA MARGINATUM.

This affection appears in the form of circular or crescentic patches, which are brownish-red and elevated at the edges; the eruption, which extends from the periphery and heals in the centre, may become the seat of papules and vesicles. Similar patches often form in the neighbourhood, and extend in circles. The affection occurs chiefly on the genitals, inner surface of the thighs, around the anus, on the abdomen, and sometimes on the axilla and on the legs of "swaddled" infants. The longer the disease lasts the greater is the thickening and infiltration of the skin, as also the formation of scales at the periphery, yellowish or brownish-red crusts being produced by scratching. The disease is more frequent in males than in females.

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* This case is of interest, as showing the source of infection. A gentleman consulted me on account of herpes tonsurans affecting the chin. I found, on inquiry, that his dog was affected with the same disease. Shortly afterwards his servant presented himself with herpes tonsurans on the chin, in this case associated with rather deep infiltration of the skin, and pustules at the apertures of the hair-follicles (sycosis parasitaria). In all these cases the diagnosis of herpes tonsurans was established by the microscope. About a year later, the gentleman showed me a patch of eczema marginatum on the inside of the thigh at the part corresponding to the scrotum. In the course of treatment the eruption spread by the formation of new vesicles in the periphery; in the scales, fungus elements were discovered.

Hebra first described the disease as eczema marginatum, and *Köbner* discovered its parasitic nature—attributing it to the same fungus as herpes tonsurans (klinische und experimentelle Mittheilungen, Erlangen, 1864). *Bärensprung* briefly notices a similar affection under the term *erythrasma*, which is described as parasitic. In the first edition of this work (pages 167 and 349) I have recorded my views on this affection. *P. I. Pick* has also confirmed the parasitic nature of the disease (Archiv. für Dermatologie und Syphilis, I. Heft, 1869). In some cases *Hebra* has found mycelial filaments, but leaves it doubtful whether the fungi may be merely chance accretions (Archiv. für Derm. 1869, II. Heft). *Hebra* does not adopt *Köbner's* view as to the identity of herpes tonsurans and eczema marginatum.

In regard to the parasitic nature of this affection the following general questions arise:—1. May fungi exist as accidental accretions of skin diseases? 2. Do they influence the extension and form of existing eruptions? 3. Is eczema marginatum a modified form of herpes tonsurans, produced by such agencies as profuse perspiration, elevated temperature, and friction of opposed surfaces?

To these questions our reply is in the affirmative.*

In many cases we have observed the development of eczema marginatum from *intertrigo* on the inner surface of the thigh, which occurs as the result of riding and similar mechanical irritation. The fungus growth being transmitted to the eczematous surface (most frequently by the linen), finds the conditions favorable to its development—moisture and high temperature—and, by the peripheral extension of the mycelia, gives rise to the circumscribed eruption which is so characteristic of eczema marginatum. The diagnosis of the disease is founded not merely on the presence of fungi (which may be accidental), but on the peripheral extension of the eruption in the form of papules and vesicles, and the simultaneous occurrence of the fungus growth. In order to avoid errors of diagnosis, the deeper portions of the scales and crusts must be examined with a view to the discovery of fungi.

Eczema marginatum may, therefore, be developed from eczema intertrigo by fungus accretions, which, undergoing proliferation in the epidermic tissues, modify the form and mode of extension of the disease. More frequently, however, eczema marginatum is

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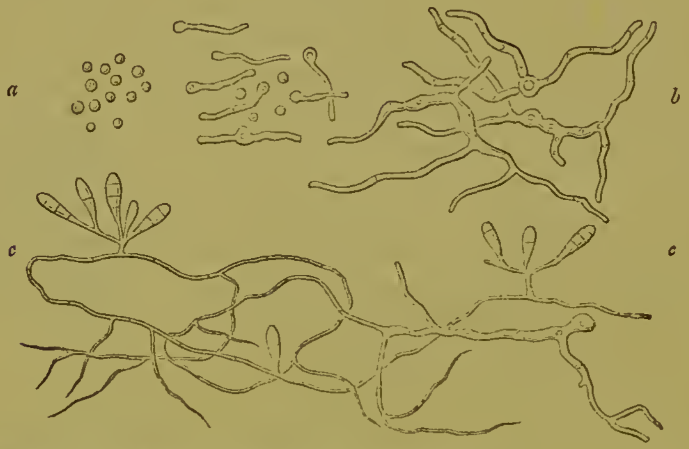
* The further consideration of the first question is reserved for a future work.

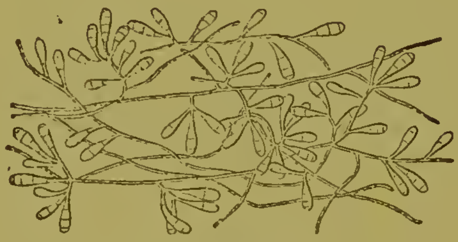
Fig. 65.



a. Development of trichothecium (within 20 days) from conidia. *b*. Tubes *c*. Conidia formation. Some are developed in the form of tubes (Fig. 65 *b*,) rarely with one or more septa, more frequently with vacuoles).

developed from herpes tonsurans by the agency of conditions favorable to the fungus growth, as on the parts around the genitals. *Köbner* has justly laid stress on the latter mode of origin; on this point, however, authors are at variance. In some

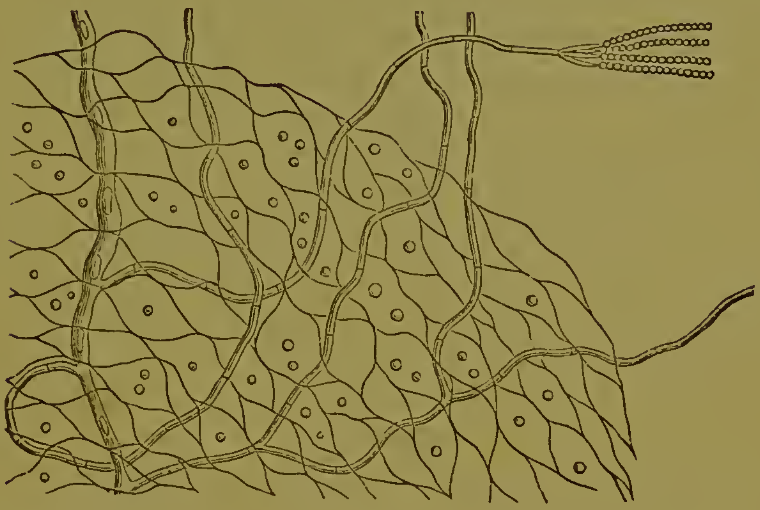
Fig. 66.



Trichothecium.

cases we find the characteristic eruption of eczema marginatum on the thighs and genitals, and at the same time the eruption of herpes tonsurans on other parts of the cutaneous surface. In several cases I also observed a primary eruption of herpes tonsurans, succeeded by the characteristic phenomena of eczema marginatum; and this observation tends to prove the convertible nature of the two affections. This view is also confirmed by the results of inoculation; in the majority of cases I found *penicillium*, and also *trichothecium* (the latter not previously observed). From all these data we are, therefore, justified in regarding eczema marginatum as a modified form of herpes tonsurans.

Fig. 67.



Eczema marginatum (after 24 days' culture); the mycelia developed into penicillium.

Microscopic Results.—On examining the scales of eczema marginatum we observe round (Fig. 65*a*) or long conidia, which refract the light strongly; these are isolated or united in groups or chains (Fig. 61); many of them have two or more globular structures in their interior.

Besides these forms, we meet with long-jointed mycelia, anastomosing in various directions between the epidermic cells; these display in their interior numerous glistening molecular structures, which frequently resemble vacuoles As in other parasitic affections, there are also abundant bacteria and micrococcus. I have found these organisms in greatest number in cases in which the skin was considerably infiltrated and covered with scales and crusts. As in similar conditions, the mycelia undergo decay, and sterile bacteria and micrococcus cells preponderate. On inoculation of the scales taken from a case of eczema marginatum, I traced the development of the mycelial filaments (Fig. 65) to the formation of conidia, and in four cases, obtained from the mycelia, an interesting and hitherto unknown organism, which I have termed *trichothecium;* this fungus greatly resembles the *acrothecium parasitans* described by *Corda.* When fully developed, *trichothecium* forms a delicate, yellowish-white, and floccose spawn (Rasen); these anastomosing mycelial filaments are divided into long joints by septa; the conidia are first generated at the tips of the creeping mycelia, and, when fully developed, are long clavate structures, with delicate walls, and divided by two, three, or four partitions; under the microscope they appear white and transparent. Beneath these conidia others are formed in succession on the same branchlet, to which they are attached either directly, or by short pedicles, so that a single filament bears several conidia, which are arranged in grape-like clusters (Fig. 66). As already noticed, the *trichothecium* approaches nearer in form to the *acrothecium parasitans* (which *Corda*[*] has described as a parasite on Stysanus) than to any other fungus growth with which I am acquainted. The *trichothecium* is distinguished from *Corda's* fungus by the elavate conidia arranged in clusters, whilst acrothecium has long conidia often laterally curved, somewhat resembling *fusisporium.* The allied organism, *T. roseum* and *T. album,* which are frequently parasitic on decaying vegetable matter, present two-chambered conidia. In other instances I observed the development of penicillium (Fig. 67), from the mycelia, after a period of from eight to twenty days, and this was especially marked in cases in which the eczema spread rapidly at the periphery by the formation of vesicles. Two of the cases were associated with herpes tonsurans (of the trunk), from the scales of which I also obtained *penicillium.*

The clinical and microscopical researches in regard to eczema marginatum afford the following results :—

1. The invasion of fungi may transform a pre-existing common eczema (intertrigo) into eczema marginatum.

2. In certain localities a pre-existing parasitic affection, as herpes tonsurans or pityriasis versicolor, may be developed into eczema marginatum.

3. In the earlier stages of eczema marginatum, the fungus growth is nearly always present; in inveterate cases usually absent.

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[*] This fungus growth is described and delineated by *Corda* (Icones Heft; II page 10) as a type of the sub-variety trichothecium.

4. By culture of the fungus elements in eczema marginatum, *penicillium glaucum* or *trichothecium* is developed.

Treatment. The treatment of this affection is similar to that of ordinary eczema; we must, however, be prepared for the obstinate character of the disease, especially in cases in which the patients follow their occupation during the treatment. The cure is rapidly effected only in cases in which friction of the opposed surfaces (scrotum and thigh) is prevented, by keeping the patient at rest. The affected parts are rubbed with potash soap or *spiritus saponis alcalinus;* in slighter cases, with an alcoholic solution of carbolic acid, and then treated with tar or diachylon ointment; and the parts are frequently powdered with starch, in order to avoid recurrence of the disease.

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